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graphics

Designer's Guide to

Illustration Techniques:

The Traditional and the Digital

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On Our Cover How do you illustrate the subject of illustration? Learn how our 1992 Cover Competition winner, Boston-based illustrator Pat Corrigan, devised his entry in this issue's "Editor's Note" on page 6. For a look at more winning approaches, see "1992 Cover Competition Runners-Up" beginning on page 30.

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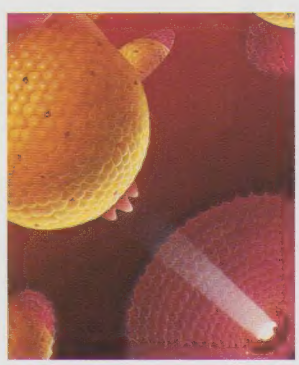

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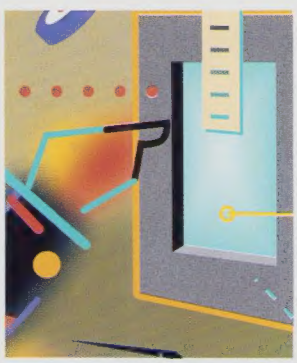

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EDITOR'S NOTE

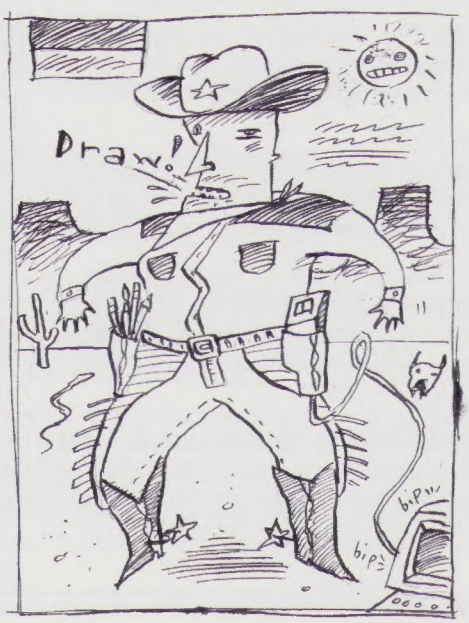
Of the many disciplines we cover in *Step-By-Step*, illustration is one of the most popular, no doubt because of the many hats that graphic arts professionals wear. Designers often create illustrations. Illustrators often design. And art direction seems to be a part of everyone's job. Certainly, this was common even a generation ago, but recently these lines have become further blurred as electronic tools take their place alongside drawing boards in many studios.

After tackling the subjects of paper, print production, type and color in previous Designers Guides, we felt it was time to challenge ourselves—and you—with a guide to a wide variety of traditional and computer illustration techniques. We know, of course, that not even a series of illustration guides could completely cover all of the possible styles and approaches, but we are confident you will find lots of great information that you can put to work right now, and in future projects.

COVER COMPETITION Once again our cover contest drew entries from all over the United States, Canada, Mexico, Europe, New Zealand, Pakistan and other interesting spots on the globe.

Winner Pat Corrigan, whose oil illustration graces the cover, created a spoof of the cowboy legends of the American West that humorously communicates our theme. When Corrigan, a 22-year-old senior majoring in illustration at the Massachusetts College of Art in Boston, hit upon the idea of working with common clichés, the cowboy "draw" theme soon followed.

In class (while he was supposed to be listening to a lecture) the artist drew a small thumbnail sketch of the figure (below). "I began thinking of the cowboy's belt and associated it with illustrators who must face the marketplace with a few techniques under their own belts," he says. Corrigan enlarged his sketch on a photocopier—he starts small because he feels he can "handle the characters better"—then cut a 12¾ x 15-inch piece of Bainbridge illustration board.



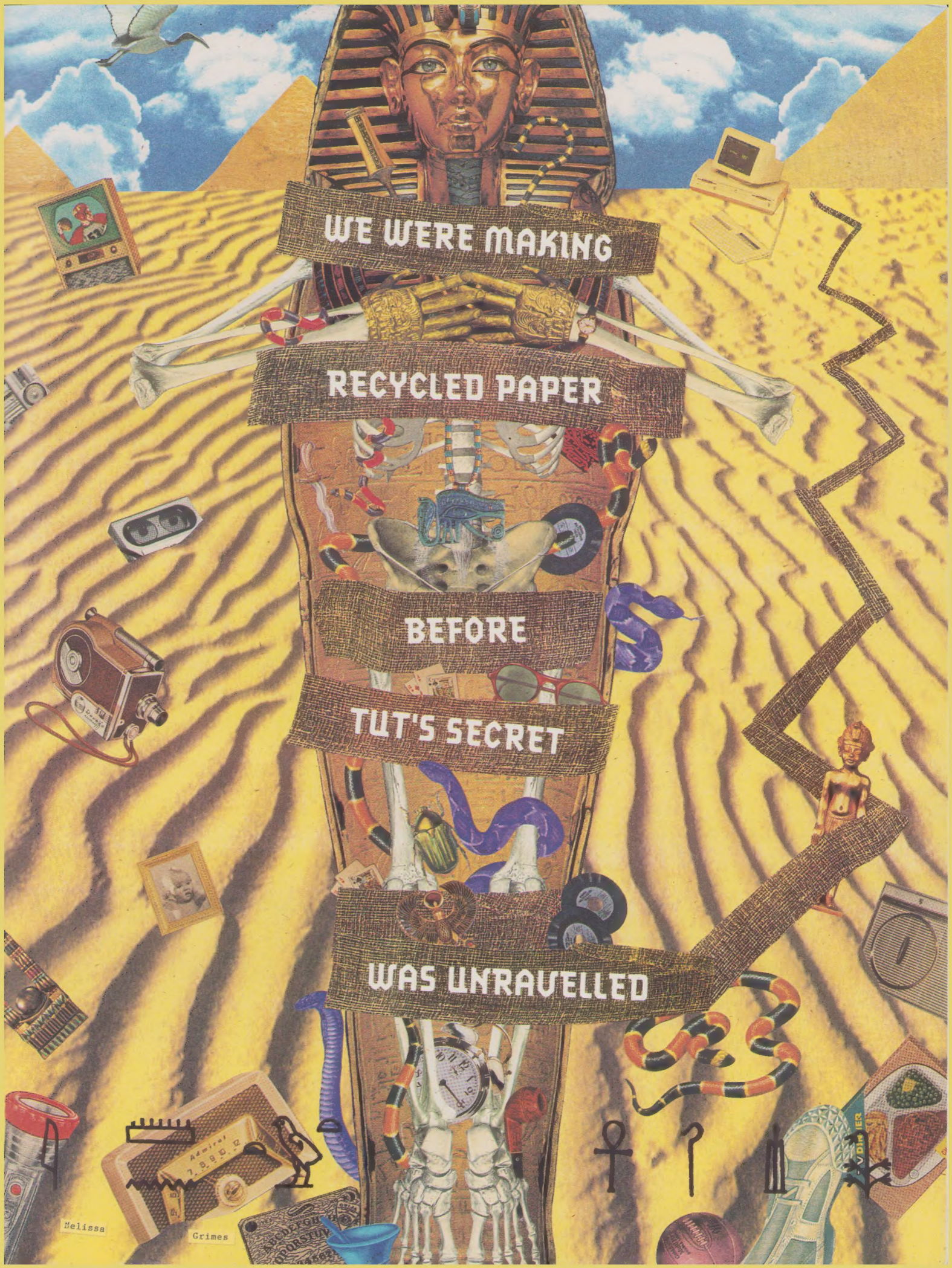
Using oil paints and a rag, he then spread red and yellow pigment onto the board trying to create an overall interesting texture. After spraying the surface with Krystal Klear fixative, he added another background layer with splattered paint thinned with turpentine. He worked the splatters into the surface in order to create a textured, mottled effect, then sealed the background with another layer of fixative. Corrigan's goal was simple: "To create a surface I want to paint on—one that will be a technical mystery to those who view the painting."

Using graphite on the back of his sketch, the artist then transferred the drawing onto his board. "Basically, the procedure after that is to paint the figure, keeping the pigment as thin as I can so viewers can still see the background." Corrigan first lays paint on with a brush, then uses his fingers to manipulate it. (He wears a glove when working with lead-based pigments.) For example, on the shirt he laid in white over the background color, allowing the orange to create the edges, then worked in darker color around the figure to form the contour lines. For details, he used a 00 brush. Finally, he clipped the letters for "DRAW" from magazines and pasted them onto the illustration.

Positioning himself decidedly in favor of traditional tools, the artist estimates he spent approximately 15 hours on the piece. He says he has been influenced by illustrators Brad Holland and Lane Smith, especially in his approach to the application of oil paint. "I like painterly illustrators," he emphasizes.

THANKS TO ALL Many thanks to all of you who entered our cover competition, as well as to our four talented judges this year—illustrator/designer Javier Romero of New York City and Madrid; illustrator Gary Kelley of Cedar Falls, Iowa; designer/illustrator Louis Fishauf of Toronto, Canada; and Deborah Flynn-Hanrahan, acting art director of *The Atlantic Monthly*, substituting for Judy Garlan, who gave birth to twin boys at judging time. Congratulations, Judy! Congratulations also to Corrigan and the six runners-up, whose work you will find showcased in this issue.

—John Fennell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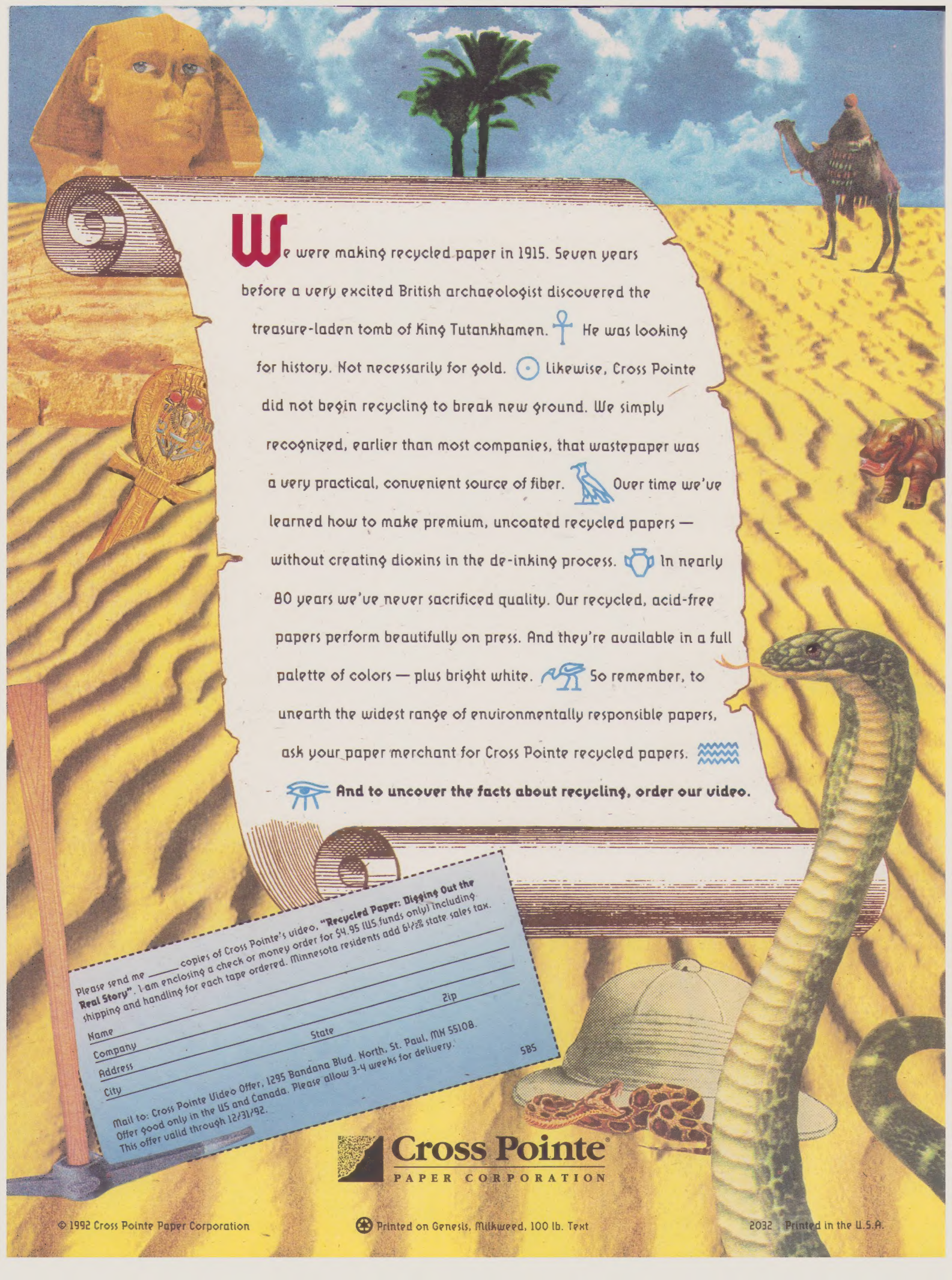

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LETTERS

Society of Illustrators on Annuals

As President of the Society of Illustrators, I have been reading with great interest the letters you have received in which the Society's and other annual shows have been discussed. Many of the concerns aired in these letters have been, and continue to be, the subject of serious discussion and consideration among the Society's board of directors.

On an ongoing basis, the Society reviews its annual exhibition and makes every effort to ensure that it reflects, to the very best of its ability, the highest quality of illustration throughout the country. Every aspect of the process and judging is examined periodically with the goal of improving and expanding the types of work considered while upholding its standards of excellence. We are, at this very time, addressing this issue once again with great dedication.

The Society appreciates all of the comments made and the interest shown in our Annual, and welcomes any and all additional comments which will most assuredly be taken into consideration. It's certainly in the best interest of us all, and of our profession.

Eileen Hedy Schultz, President
Society of Illustrators

Vignelli Collection

I saw the collection of Massimo Vignelli clothes in *Step-By-Step Graphics*, Vol. 7, No. 6., and I liked the designs very much! My question is: Where in Europe (or even in Sweden) can I find the clothes?

Karlerik Lindgren
Stockholm, Sweden

Editor's Note: Unfortunately, as of this writing, the clothing is only available in the United States. However, Luminaire (361 W. Chestnut, Chicago, IL 60610; 312-664-9682, fax 312-664-5054) will ship clothing outside the U.S.

Quadratone Kudos

Compliments on the article "Crafting the World's Finest Quadratones" (Vol. 7, No. 6), which included the 300-line reproductions of Irving Penn's photography.

At the 1990 Graphic Arts Fair in Drupa, Germany, we admired printed posters with the fantastic resolution of 610 line screen. The results were near (continuous tone) reproductions of the original photography.

Hubert Fritz Bierast
San Paulo, Brazil ■

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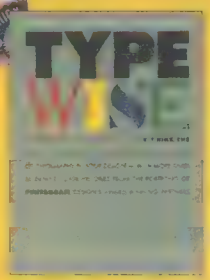

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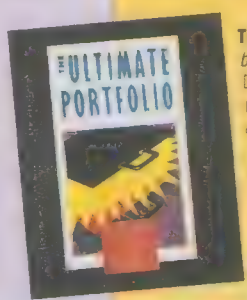

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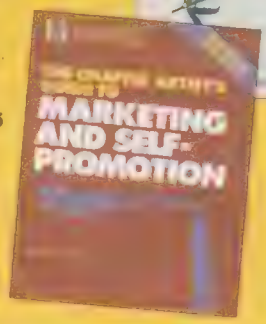

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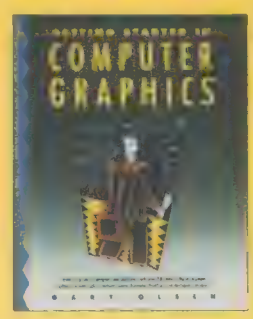

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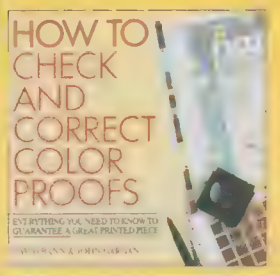

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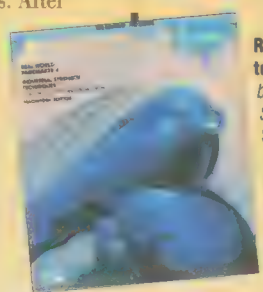

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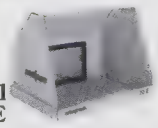

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DESIGNER: Anita Meyer

DESIGN FIRM: plus design, inc., Boston, MA

CLIENT: The Getty Center for the History of Art and the Humanities

PAPER MERCHANT: Ris Paper Company, Woburn, MA

MERCHANT REPRESENTATIVE: Kelli Keough

PRINTER: Aldus Press, Inc., Malden, MA

PRINTER REPRESENTATIVE: Erika Winkler

PAPER: Cardigan, text

LETTERHEAD CATEGORY:

TITLE OF ENTRY: "Nancy Frame Design Letterhead and Stationery"

DESIGNER: Nancy Frame

DESIGN FIRM: Nancy Frame Design, Durham, NC

CLIENT: Nancy Frame Design

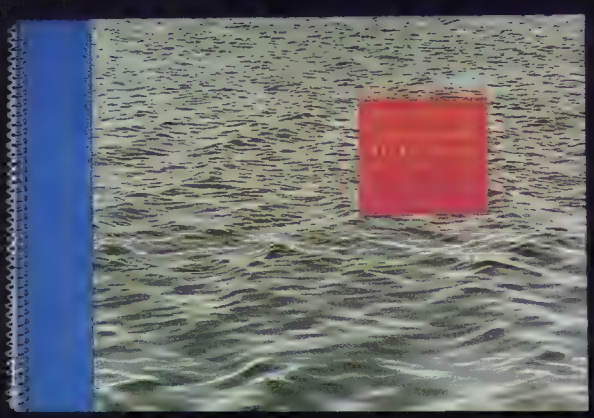
PAPER MERCHANT: Dillard Paper Company, Raleigh, NC

MERCHANT REPRESENTATIVES: Dave Ervin and Judy Balthrop

PRINTER: Regulator Press, Durham, NC

PRINTER REPRESENTATIVE: Emily Wexler

PAPER: Cardigan, text



RECYCLED CATEGORY:

TITLE OF ENTRY: "South Saskatchewan River Basin Study"

DESIGNER: Catharine Bradbury

DESIGN FIRM: Bradbury Design, Regina, Saskatchewan

CLIENT: Saskwater/ Environment Canada

PAPER MERCHANT: Barber-Ellis Fine Papers, Regina, Saskatchewan

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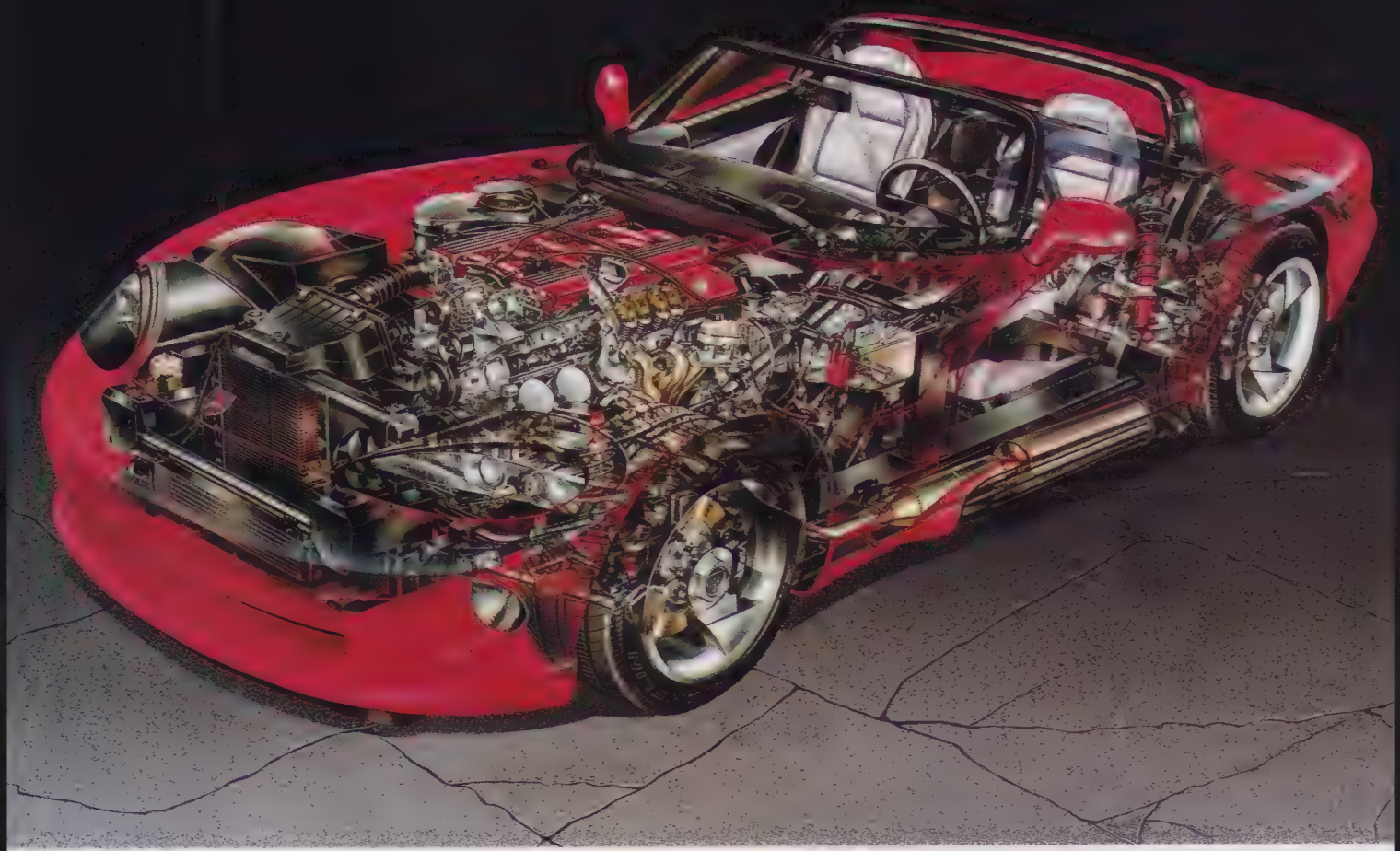

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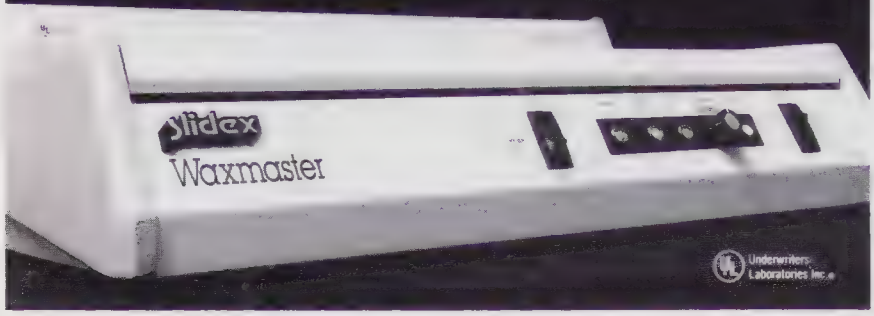

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PC MAGAZINE EDITORS' CHOICE November 28, 1989 Wacom SD-421L

MacUser 1·9·8·9 EDITORS' CHOICE HONORABLE MENTION

MacWEEK 1990 Wacom SD-420L Wacom Inc.

MacUser June 1990 SD-510

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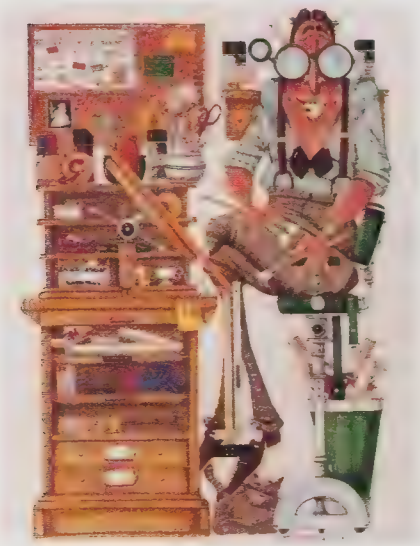

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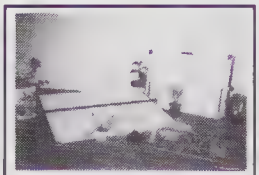
Drafting Boards & Tables

OPAL — Sizes: J-2,J-3 J-4,J-5



ONYX — Sizes: J-2,J-3 J-4,J-5

GARNET — Sizes: J-2,J-3 J-4

CRYSTAL — Sizes: J-2,J-3 J-4

TURQUOISE — Sizes: J-2,J-3 J-4,J-5

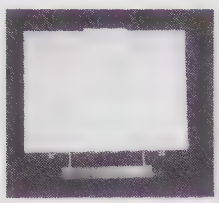
AGATE — Sizes: J-1,J-2, J-3,J-4, J-5

QUARTZ (TABLE) — Sizes: J-5

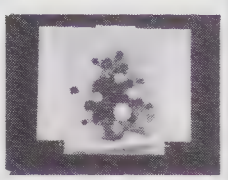
QUARTZ (SIDE) — Sizes: J-5

Desk Top Easels - The Artist

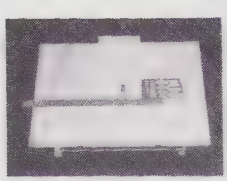
Board Sizes: Canvas Capacity
J-2 B/A
(Bottom Adjusting)
T/A ———— 16" x 20" thru 24" x 36"
(Top Adjusting)
J-3 B/A or T/A —— 18" x 24" thru 30" x 40"
J-4 B/A, T/A or D/A – 24" x 36" thru 40" x 50"
(Double Adjusting)



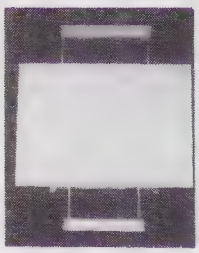
BOTTOM ADJUSTING



B/A W/CANVAS



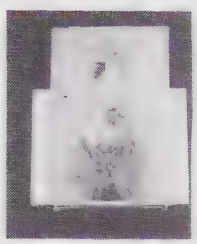
AS DRAFTING BOARD



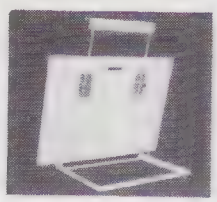
DOUBLE ADJUSTING

DOUBLE ADJUSTING W/CANVAS

TOP ADJUSTING



TOP ADJUSTING W/CANVAS



TOP ADJUSTING BACK

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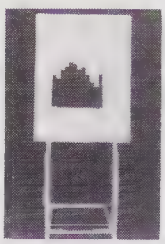
J-4 = 25.6" x 36.2" x 5/8"
J-5 = 31" x 42" x 5/8"
J-6 = 36" x 48" x 3/4"

THE INNOVATOR

DISPLAY EASEL

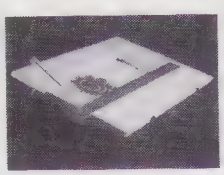
PAINTING EASEL(OIL)

LIGHT BOARD



PRESENTATION/FLIP- CHART EASEL

DRAFTING TABLE



DRAFTING/SKETCHING BOARD

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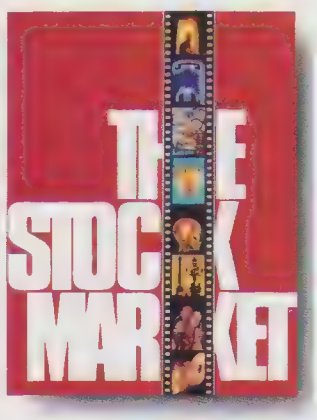

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120 RICH, NEW COLORS

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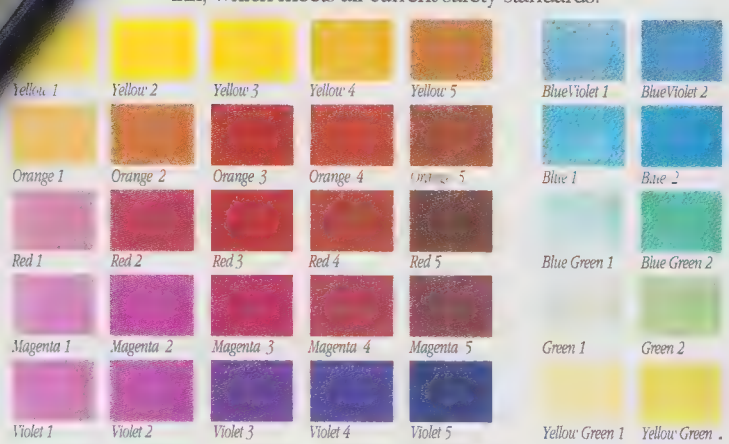

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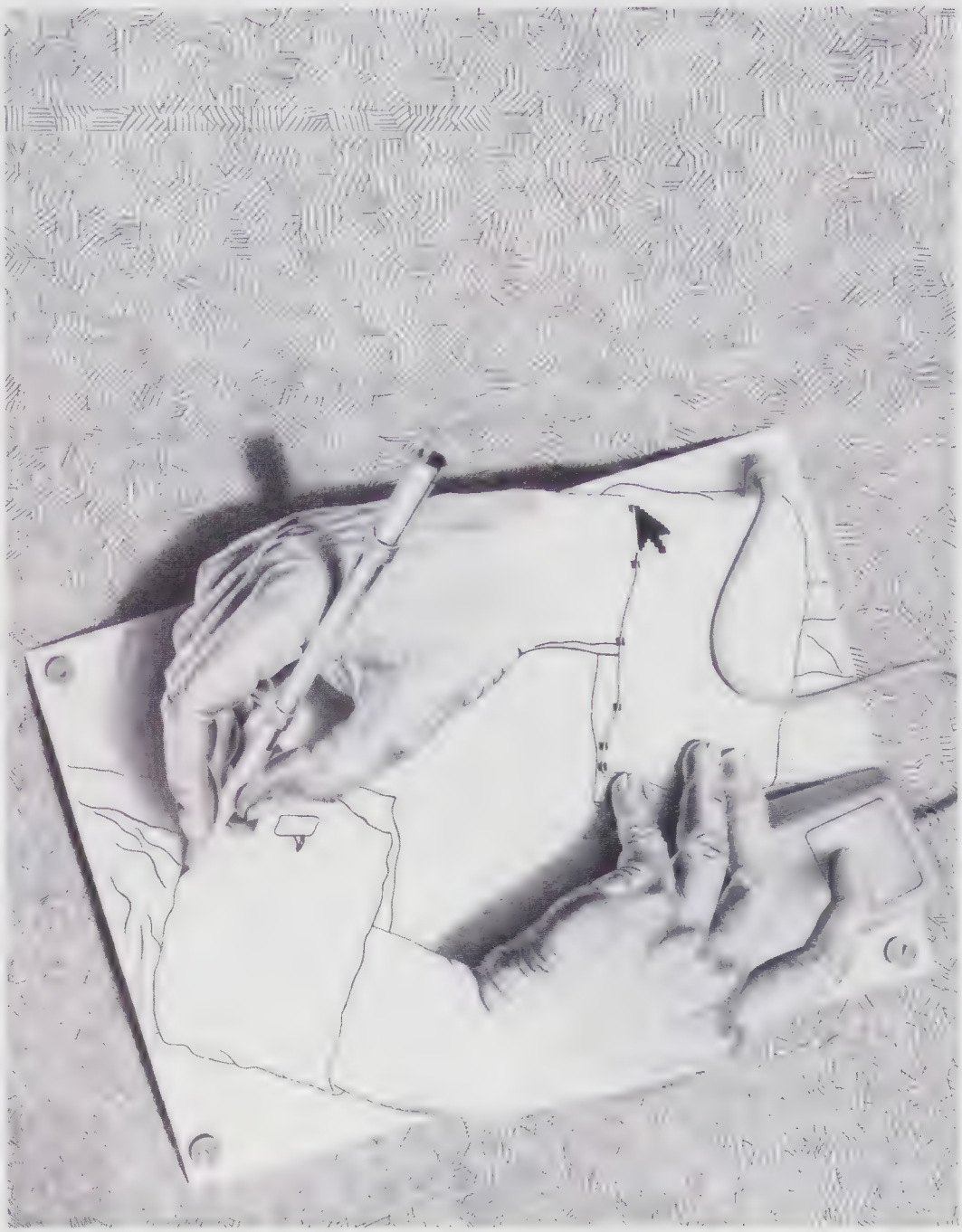
Circle 21 on Information Card

1992 Cover Competition Runners-Up

This year's cover competition drew entries from all over the world in a wide variety of styles and media, from paints and photography to traditional and electronic 3-D. Entries rendered in traditional media outnumbered those created electronically, but there were enough digitally rendered images to safely say that many who entered now think of the computer as their primary tool. Judges Gary Kelley, Javier Romero, Louis Fishauf and Deborah Flynn-Hanrahan (substituting for Judy Garlan) chose Pat Corrigan's cowboy image for the cover of this issue, followed by the six runners-up shown on the next few pages. Interestingly, each of the winning entries was rendered in a different style and medium.



Graphite David Candland, a recent graduate of Ricks College in Rexburg, Idaho, now living in the Seattle area, reworked a famous M.C. Escher drawing to show how today's graphic artists "can't survive without both traditional and digital tools." Candland first scanned a photo of the Escher print into Photoshop with the idea of manipulating it on screen. Disappointed with the results, he turned to graphite. He first drew the image with a 5H pencil, then gradually built up the darks with softer pencils. The darkest darks, for example, were rendered with a 6B pencil. While he used the Escher print for reference, he had to entirely redraw the hand holding the mouse.

Acrylic *Step-By-Step* editors affectionately call Patrick Ho's acrylic entry "Mac Moses." "I like that name a lot," says Ho, of Palo Alto Calif., a freelancer whose intention was to personalize the illustration by creating a character— "a designers' guide" —who holds a baby-like computer to show viewers there are new approaches on the horizon. After transferring his image to Crescent 100 cold press illustration board, he laid in his initial washes using brushes and Liquitex acrylics. He then worked from the background to the foreground developing form and detail. "The most difficult areas to render were the folds," says Ho, "because of the subtle color textures and changes."

Three-Dimensional Art Designer/illustrator Linda Anderson's three-dimensional entry suggests a fusion of traditional and electronic tools. To build the image, Anderson, of Danvers, Mass., first propped up the floppy disk with sponges and glued the traditional tools into the center of the disk. The point rule, compass and ellipse were also glued to the board outside of the picture frame. Anderson took the finished setup to a professional photographer who shot 35mm film. Unfortunately, while experimenting with hot lights, the disk melted. When rebuilding, Anderson backed the disk with stiff cardboard and had the setup reshot under cool lights.

Manipulated Scan What struck judges about Jeffery Wilt's entry was the unusual color palette and the symbols he chose—a shiny nut and a rusty bolt—to represent how old and new illustration techniques are merging. To create the image, Wilt, a designer from Charleston, W.V., took a photograph of a still life he had set up, scanned the color print on a Microtec 300 Z scanner and imported it into Photoshop with a Mac IIcx. Using the Add Noise filter, he then created a speckled texture in the background. The black type was created in Freehand, the title type in Illustrator and the large green background type in ColorStudio. The final image was then composed in QuarkXPress.

Charcoal/Mixed Media Curtis R. Sayers, a designer from West Islip, N.Y., worked for two weeks to come up with this concept, one that graphically shows how electronic tools should be as easily accessible to graphic artists as traditional ones. Sayers drew the image and the type with charcoal on white charcoal paper, then had a film positive made, which he attached to a board. For color, the designer used a combination of film, markers and colored pencil directly on the board. He first attached a sheet of Letratone to the back of the film to create the background texture, then used marker for the shadow on the mouse and colored pencil for the tools. The background color was created from a sheet of Letraset film. The board was color-separated conventionally and the film positive scanned as line art on the black plate.

Electronic 3-D Yoshihide Sodeoka's goal in this runner-up entry was to show how the illustration industry should not try to separate traditional and electronic tools. "They must meet each other," says Sodeoka, a computer graphics student at Pratt, who worked on a Mac IIcx with StrataVision 3D and Photoshop 1.07. Sodeoka first modeled the forms with the 3-D software, then scanned a photograph of bricks and used StrataVision's texture-mapping capabilities to add texture to the wall. Details, like the edge of the brick wall, were colorized in Photoshop. Because he planned to output the file as a slide on a PC-based QCR slide output machine, he converted his PICT file to a .TGA file. ■

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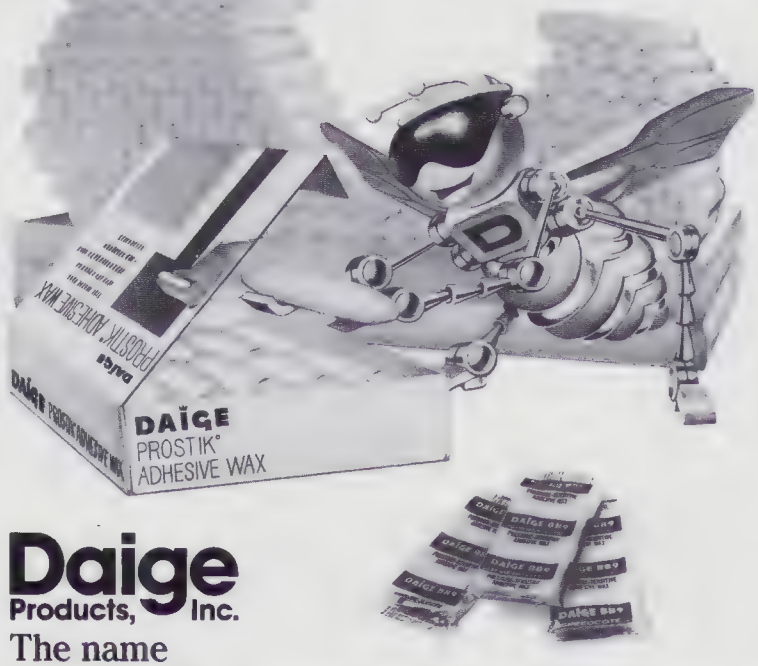

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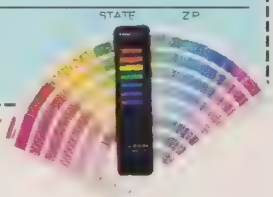

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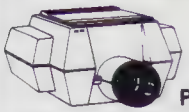

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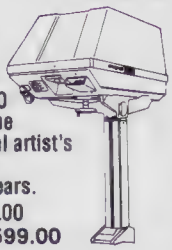

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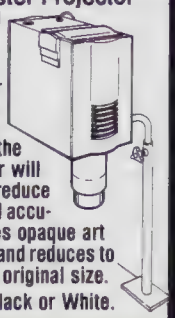

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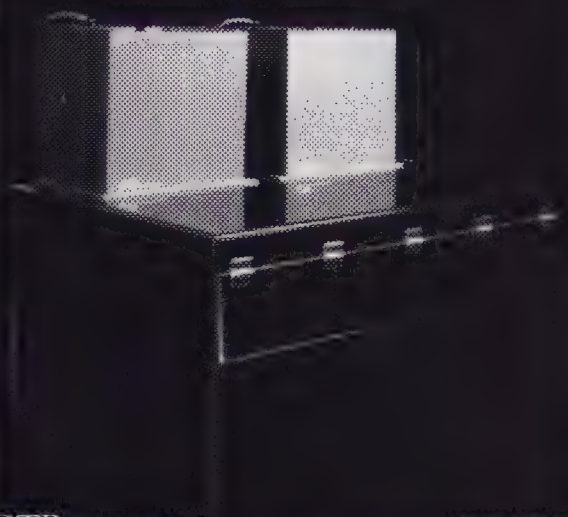

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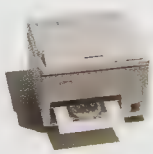

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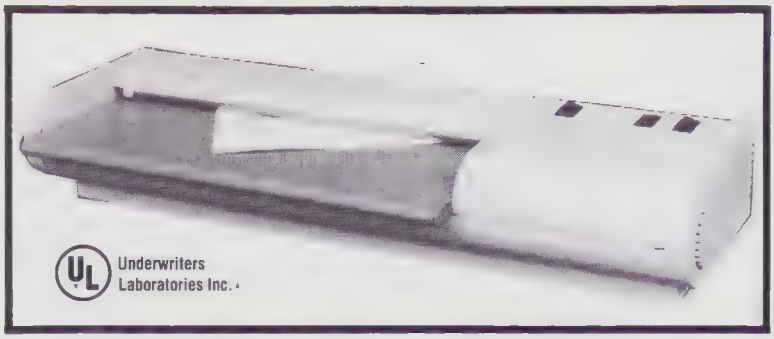

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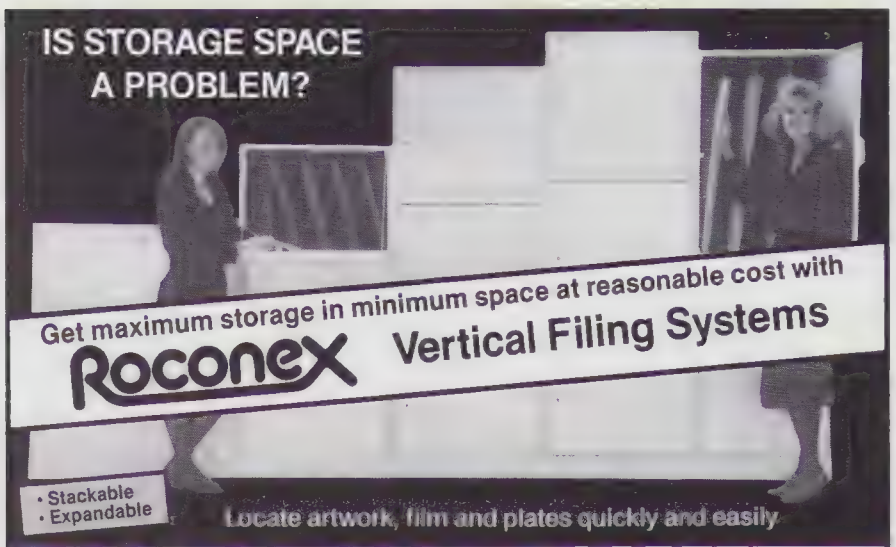
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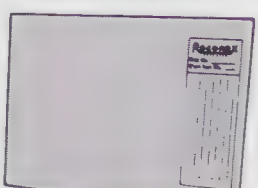

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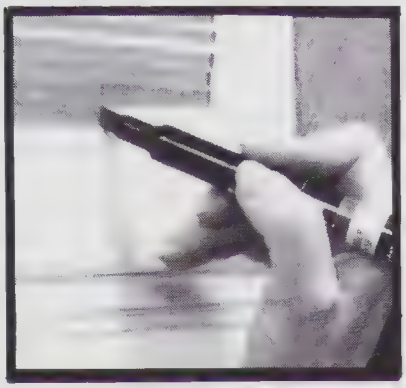

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Traditional Techniques

Problem-Solving with Colored Pencil

Bill Nelson demonstrates how to handle problem areas like dark shadows, skin tones and fabric folds when working with this versatile medium.

Believable Skin Tones Once I have blocked in shadows, created the midtones and some details, I applied more color over the entire face again. I have toned down the green highlight and the color on the lips, as well as pumped up color on the flesh tones to give it a richer look.

By Bill Nelson

Colored pencil is more than just a drawing medium. In my estimation it can compete with more traditional painting media like oils, acrylics or watercolor. While not as fast or as flexible as these media, it can still achieve depth of tone and rich color—it just may take a little longer.

Ever since I wrote an article about colored pencil in the premier issue of *Step-By-Step Graphics*, readers have asked for more detailed information about the techniques I use. This is an attempt to answer those questions. As most illustrators who work with a single medium discover, certain problems arise over and over again. This is especially true with colored pencil, a wax-based medium that can easily become overworked if not applied with careful planning. To give you a better and more detailed insight into the medium, I will show how I handle persistent problems like dark shadows, how I build up layers of color in skin tones and fabric folds, how I handle highlights and gradations and why I choose the colors I do.

MATERIALS/APPROACH

While I use Prismacolor pencils almost entirely, I sometimes substitute other brands of wax-based colored pencils (Derwent, Spectracolor, Karismacolor and so on) that may meet the needs of a particular illustration. I prefer Prismacolor because of its color intensity and immediacy. On average,

Skin Tones For this job, I had to create rich skin tones as well as provide an illusion of roundness in the face.

1 Using a No. 2 pencil on Crescent mat board No. 986, I drew a basic outline of the face, then added minimal shadow around the eyes, nose, mouth and hair with a black Prismacolor pencil. I use it only to give definition to the darkest opaque areas and the beginnings of the dark shadows.

2 Directly over the black shadow areas on the face, I add Tuscan red, making sure to exert a little more pressure only in the darkest areas. I apply color with a sharp pencil point in short, linear strokes.

3 I begin adding higher key colors, primarily terra cotta with touches of vermillion, over the shadow areas. I make sure to extend the shadows a bit with pure color to add warmth and dimension to the face.

4 Next, I blend flesh color into the terra cotta and vermillion using short, linear strokes. I then add green highlights under the nose and in the crease of the cheek to suggest reflected light. For general highlights on the flesh, I use a white pencil blended into the flesh tones. Then I add Pro White (Daler-Rowney) for the highlights on the nose, lips and teeth.

Photos by Mike Pocklington

Handling Dark Shadows To complete this piece, which called for dark shadows, I reapplied color to the entire face again, toning down some areas and making sure the colors used in the rest of the picture work in harmony together. Despite the layers of color, the dark shadows remain luminous.

I use one colored pencil every half-hour. This is because I like to keep them very sharp. In a matter of 10 minutes, I may sharpen my pencil five or six times.

In general, I find that restraint must be used when working with colored pencils. If one part of an illustration will eventually be a solid area of color, the tendency is to bear down hard, using the brilliant color available from that pencil point. I try to avoid that method for two very good reasons: That much wax on the surface attracts dust and causes the area to lose its brilliance. And second, it is also very difficult, if not impossible, to blend another color into a solidly drawn area without it becoming very muddy. Instead, I have discovered it is best to use light, linear strokes in two or three different directions, gradually building up an area that will appear solid. Working this way teaches the restraint and patience necessary when working with colored pencil.

That's also one of the reasons I don't use colored pencil sticks for large areas like backgrounds. My solids are illusionary; they are basically strokes applied in different directions that appear to be solid. I work in small areas and connect them.

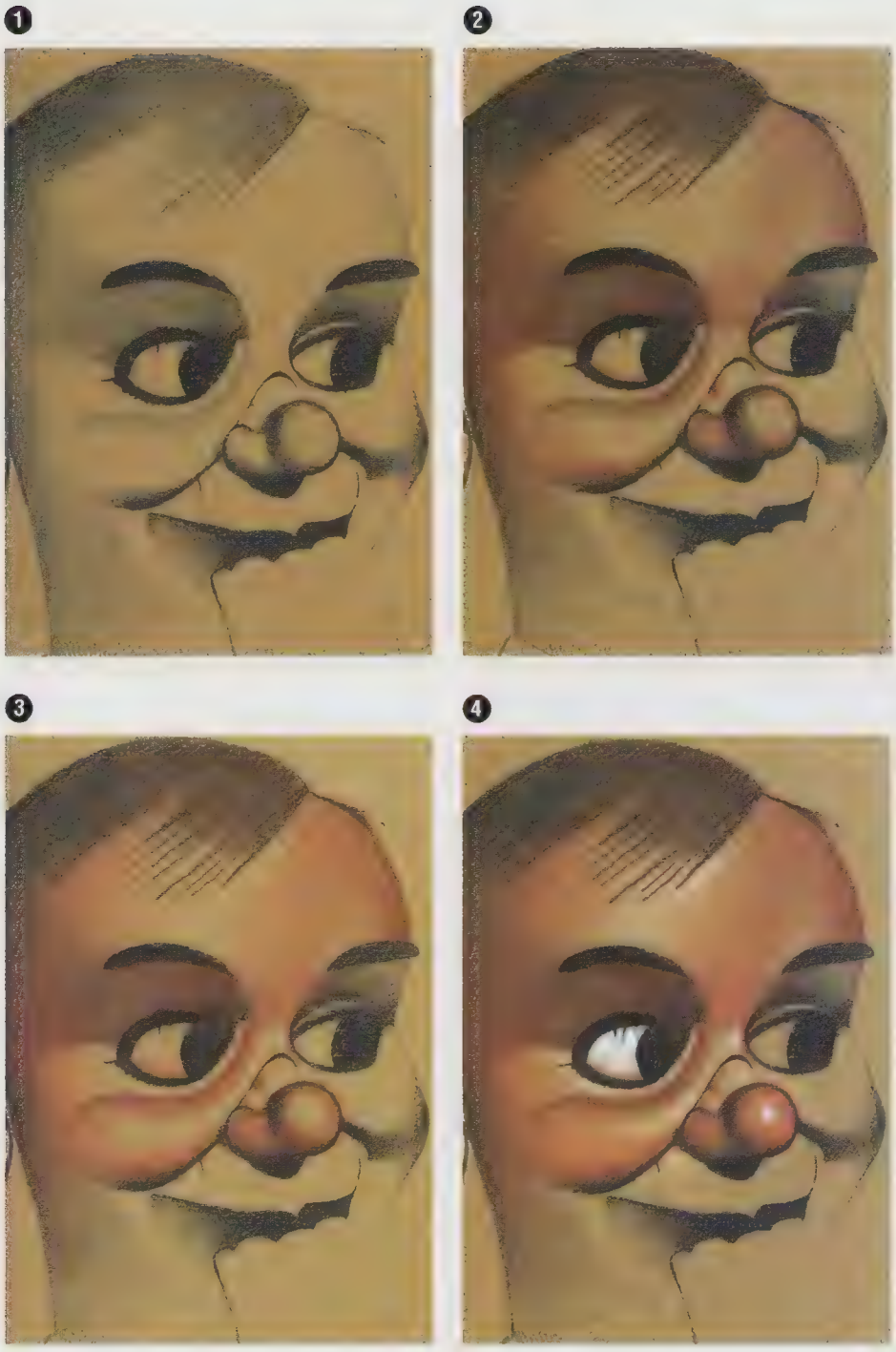
DRAWING SURFACES Over the years I have experimented with many drawing surfaces. One of my favorites is Crescent mat board, particularly those boards with a low tooth or grain. This is important because the surface has to be soft enough for the pencil point to depress or defeat the tooth where I need a smooth look. I favor boards in dark colors, mostly browns and tans, but occasionally I will use a gray. By exerting varying degrees of pressure on cold press surfaces like these, it is possible to overcome the grain. In contrast, it is also possible to allow the grain to dictate the look or texture of an area, thereby making it part of the overall drawing.

Another surface I often turn to is Canson charcoal paper, which has two distinct sides: the front has a waffle-like pattern, the back, a smooth, almost blotter-like surface. I always use the smooth side, which is great for the kind of blending I like to do. As with the Crescent boards, I prefer browns, tans and grays (in this case, felt gray is my favorite). Working on dark paper compensates in part for the lack of vibrant color associated with the medium. Whites pop off the page, bright colors appear to be brilliant and shadows are easy to handle because the dark paper becomes part of the background. Working on these papers creates the illusion that the light colored pencils are much, much brighter. It seems as if I am almost finished before I begin.

DARK VS. LIGHT PAPER One result of working on dark paper is that my drawings tend to be dark. In most cases, that is why I chose the paper; I like the mood I can create with these rich, dense areas of color. But when the assignment calls for a lighter look, I use a white board. Normally, I first draw my subject on the white paper, then apply a wash over the drawing to tone down the bright white.

SIZE Generally, I work about 14 x 17-inches. Some pieces are smaller, others larger. Most of the illustrations take about a week or so to complete. I rarely spray-fix finished pieces because I feel it changes the colors.

CORRECTIONS Usually I don't have to make corrections in my drawings because they are well planned, but there are times I have erased. Lacquer thinner, which melts the



Dark Shadows Dense areas of color are not achieved through heavy application of pencil. Instead, layering is the key.

1 As in the first demonstration, I use Crescent mat board No. 986 and build up the darks and shadow areas with a black Prismacolor pencil. Layering in the black with short strokes, I make sure to cover the darkest areas with many layers of feathered linear strokes, applied in different directions.

2 I add a layer of Tuscan red over the black to warm it up. Tuscan red plays a major role because the head is mostly in shadow. I apply the red liberally into all areas that are shadowy and dark, using a little more pressure to achieve a smooth blending. Note how the colors optically blend in the deep shadow areas on the side of the head and on the ears, nose and eyes.

3 As I add terra cotta to heighten color, I work away from the shadow, blending it softly into the color of the board. The value differences between the red and the dark shadows become immediately apparent.

4 To create contrast, I now blend lighter colors—flesh, light flesh and vermillion for warmth and white—into the background color of the paper and into the overlapping terra cotta. While the dark and light colors appear to be blended together, this is actually an illusion.

wax, works well to remove large areas of color. Once the board dries, you can simply erase the remaining pencil. While this method can be used on illustration board, it will ruin a drawing done on Canson paper.

In the following demonstrations, which are based on previous illustration assignments, I will key in on some of the problem areas many artists encounter when working with colored pencil.

SKIN TONES

Creating believable skin tones is a matter of first building up the form for the head, then choosing a palette appropriate for the figure being drawn. One challenging job in which I had to create rich skin tones as well as give the illusion of roundness was an illustration for the musical, "Ain't Misbehavin'," produced by the Richmond, Va.-based theater company, Theater IV. (See "Skin Tones" demonstration.)

I begin all of my drawings with a No. 2 pencil. But it is important not to overdo the graphite. Keep it light and simple. Do not preshade or model your illustration with the graphite, otherwise it will come shining through and will be difficult to cover up

Variety in Folds and Fabric To add more drama to this piece, one of the final steps was to darken the background, working those darks up to the midtone and light areas. Then I added more blues, oranges and some whites. Finally, I repeated every step, strengthening color and darkening darks.

with the colored pencils.

I start the colored pencil work with black Prismacolor. When studying the black overlay for a Color Key proof, you will notice how little black there is in a color print. While minimal, it helps give the print definition. In my work, black helps me get my bearings and points me in a direction. I find black is necessary for the finite definition of the sort of heightened realism that I am aiming for. But it must be used sparsely because it is very difficult to put lighter colors over black.

Black is offensive by itself, so I add other colors to it. As the first step in giving warmth to this face, I begin blending Tuscan red into the black. How I apply the colors is extremely important. When applying the black, I softened and lightened the edges so it blended into the background color of the paper. I now extend those feathered areas with the dark red. This helps define the roundness of this figure's face and establish depth.

At this point I have established darks in the shadow areas, but there is no real color yet. To begin adding the necessary color that will ultimately give the picture life, I go over the shadow areas with terra cotta in the same way as I did with the Tuscan red.

The advantage of extending the color is that I can now easily blend highlights and bright spots into these areas. By applying the red softly and feathering it into the color of the board, the whites, creams and light fleshes I add next blend smoothly into the existing colors without having to fight with the dark red and black.

For heightened drama, I blend the colors and add a little green highlight under the nose and on the crease of the cheek. This suggests the reflected light coming from her clothing. After darkening the pupils and adding white to the eyes, I added highlights to make the nose, lips and eyes shine.

As a final touch, I usually go over everything one more time using the same pencils. This gives the illustration a richer look and pumps up areas that may have been softened too much by all the layering of colors.

DARK SHADOWS

Some illustrations call for very dark areas, and these can be a problem if not handled carefully. As I explained in the previous demonstration, it is important not to use heavy pressure to produce a solid color. Rich darks can best be achieved by layering several colors over one another. This not only builds up darks, it achieves color variations in the shadow areas that enhance the look of the finished piece.

In an illustration about ventriloquism for *The Atlantic Monthly* magazine, I began again with black to establish the basic values of the puppet's face. Black, of course, is an uncommon ground for a face because it is too cool. Facial colors need to be warmed up, intensified, which I will do later. (See "Dark Shadows" demonstration.)

It is important to remember that while establishing the basic values gives a look of a solid mass of color, it is not achieved in one layer by using a lot of pressure quickly. Compared to the previous demonstration, the blacks here are more solidly rendered, but still some of the paper shows through.

Over this optically solid black, I blend some Tuscan red. This marries the two colors. Then I add terra cotta over the dark red to heighten the color. As I work my way out from the shadow areas, the color becomes brighter, as can be seen in the nose, cheeks, forehead and around the eyes. This creates a middle-tone value against the intense darks of the shadows.

Next, I begin to blend the lights into the existing colors to create the necessary contrast. Remember, this dark-into-light blending is an illusion. I am actually just adding light colors to the neutral color of the paper

Folds and Fabric I opt for an imaginative approach when rendering cloth, which allows me to explore color combinations and light sources.

1 Because I am experimenting with the design and I am not completely sure what I am doing yet, I rough in the line drawing and initial shadow areas, as always, with black Prismacolor. My drawing surface is Canson charcoal paper. I am trying to feel the motion of this upswept arm, and in doing so, my pencil work gets looser.

2 Next, I add a small amount of Tuscan red in a few places to strengthen my resolve to push on. The red darkens and warms the shadows.

3 With a cream-colored pencil, I begin to define the brightest areas and blend them gradually into the darker ones. Note how I am blending the light into the midtone color of the paper.

4 To add richness to the folds, I blend into the cream some yellow-orange and blue. This is an easy mix because the colors are all light. However, the eye still uses the color of the paper to optically blend the tones.

and into the overlapping terra cotta, not into the darker pencil colors. This allows the viewer's eye to blend the colors together. If I had tried to blend the light colors into the dark colors, they would immediately turn muddy.

FOLDS AND FABRIC

Folds in clothing have always appealed to me because they offer an interesting and infinite variety of color combinations and approaches. When rendering cloth, I decide beforehand to dispense with reality, or whatever I might perceive it to be. Instead, I opt for an imaginative approach that allows me to explore color combinations and experiment with the way imaginary lights might be bathing a piece of cloth. This was especially true with a personal piece I did of a mythic figure of a woman. (See "Folds and Fabric" demonstration.)

When working with a difficult area like drapery, contrast is often the key. By placing your brightest brights next to your darkest darks, you will create distinctive folds that jump off the page. In competent hands

Texture Over a Watercolor Base After applying a toned wash to white board, I applied the shadow and midtone areas. Using the same basic palette, I repeated the steps until the drawing is complete. I retain the overall textural look by allowing the texture of the paper to show through.

I have rarely seen this approach fail.

Fabric is very important to all figures. Take, for example, the famous headless Nike in the Louvre. She would not appear to be nearly as powerful if she were nude, and the fabric is what gives her that power. I feel the same way about the fabrics I put on my figures. The drapery isn't just something that covers them up; it creates a sense of power that gives my figures individual identities. For me, clothing is an integral part of the drawing, and as far as I am concerned, my figures never undress. This is the way they always are. It makes them larger than life—these are not folks you just meet on the street. Yet, you can identify with them in a hopeful way.

TEXTURE OVER WATERCOLOR

Although in many of my illustrations, I use colored papers, there are times when I want a lighter look that a tan or gray paper will not give. When this happens I use a white board which I tone with watercolor washes. (See "Texture Over Watercolor" demonstration.) The process is basically the same as the previous demonstrations, but the results are very different. Depending upon the piece, I could tone the board any color. I have even toned already dark boards to create even more intense colors. This makes the lights really pop.

Laying a watercolor wash down on a large area is very tricky. Here's how I do it: First, I use a No. 2 pencil to sketch the image on the board. Next, I tighten up the drawing and define all of the outer edges. Using Winsor & Newton premixed watercolors, I mix up a wash to apply to the board. It is important to mix more color than you will need, just in case you run out. After slanting the board (I rest it in my lap), I wet a No. 5 or 6 round camel hair brush and apply color liberally to the top edge of the drawing, moving horizontally across it. Quickly, before the area begins to dry, I paint another band of tone directly under the first and allow the colors to blend. I repeat this procedure until the board is painted. If any area begins to dry as I make my way down the board, I simply replenish the brush. I often use different values on the background washes. I may paint the flesh tones light and the clothing dark. For example, in this demonstration, an illustration painted for a poster of the Richmond production of the musical "Sunday in the Park with George," the necktie, vest and palette were created using dark washes. I even used a green wash for the trees.

Artists who use this technique develop a feel for it as they watch the color from one horizontal band blend into the next. Of course, all of this can be avoided by using an airbrush. But I don't like the lack of control I experience with airbrushes; that tool seems to have a mind of its own. I also like the slightly textured surface that the watercolor creates on the board.

TEXTURE Texture is sometimes planned by choosing a particular board, at other times it comes about by accident. The board is always the same, but as strange as it may sound, sometimes I can defeat the texture on the board, at other times I can't. That can even happen in the same drawing, depending on the size at which I am working. In small areas it is easier to control the grain than in large areas. When working small, the strokes are close together and the grain can't get through. In the "Sunday" illustration, I planned to emphasize the texture on the beard, which was a direct result of the choice of cold press illustration board.

By using the same procedure for applying color that I used in the previous demonstrations, but with watercolor washes, I can achieve an overall lighter look.

LIVING WITH COMPROMISES

Colored pencil has great potential as an illustrative medium, but there are tradeoffs. The point of the pencil makes it difficult to apply to large areas; it is certainly time-consuming, and you can't get as brilliant a palette as when working with oils and acrylics. Everything always looks a little pale. It is sometimes frustrating, but since it is the only medium with which I am comfortable, I live with the compromises. In

Texture Over Watercolor When tan or gray paper is too dark for a job, I tone a white board with watercolor washes.

1 After applying a tan wash over my pencil drawing and allowing it to dry, I begin with black pencil to define the areas of dark shadow and lightly add areas of medium shadow. Note the light-to-dark gradation of tone in the beard and the application of lines in vertical strokes. The illustration board has a weave pattern that will allow more texture to be seen.

2 Next, I add the Tuscan red to all the shadow areas of the face—the eye sockets, under the nose, parts of the forehead, cheeks and around the mouth. I also begin blending color into the mustache and left side of the beard.

3 To add warmth, as well as further contrast and definition, I use terra cotta in all the same shadow areas. Where I need contrast, under the nose and the eyes, and where light meets shadow, I blend in more color.

4 For an even warmer appearance, I use vermillion and blush, again emphasizing contrast. Finally, I begin to add white to the highlight areas.

part, this is because I love the reaction I get when I am asked how I do my drawings. There is always a look of shock and disbelief when I tell them I used colored pencil. "It can't be colored pencil, it's so beautiful!" they comment. It is just that kind of reaction that makes me head to the studio and start another drawing.

So much of what artists do is like breathing. After a certain point in our careers, we cease to be aware of the stages involved. Although it is difficult to objectively see how I work, I hope these demonstrations help clear up some questions about colored pencil. Remember that the pencil strokes you create are a product of what works for you. And it is that very touch that will make the drawings you create uniquely yours. ■

Bill Nelson's colored pencil illustrations have appeared on the covers of numerous national magazines including Time *and* Newsweek. *He is the recipient of hundreds of awards including medals from the Society of Illustrators and the Art Directors Club of New York. His studio is in Richmond, Virginia.*

Wet and Free-Flowing Watercolor

How to blend colors, draw linear forms and create textured and transparent surfaces in watercolor without masks or opaque white.

By Jacqui Morgan

Water is what makes watercolor work. Juicy, painterly washes, delicious accidents and glowing transparent color are the wonderful by-products that result from using this medium as it was meant to be used—wet and flowing.

But the medium can be so versatile that it is not always recognizable as watercolor at first glance. Combined with other media such as pastel and colored pencil, it is often completely disguised. Too bad, because when an illustrator really begins to understand this medium, there is little need to combine it with others.

In the early 1980s when I switched from watercolor concentrates (dyes) to pigments, I found that painting with them gave me an unbeatable high. For me, there was no turning back. What accounts for my fidelity is the risk-taking, the transparent luminosity and the marvelous accidents I discovered that I know I would not have arrived at alone. Some have pointed out that I am a purist; students think I am rigid. Yet, I simply don't feel a need to use any other media; watercolor can do anything.

Though I admire results others achieve with liquid masks and friskets, and think someday I, too, will use them, until this moment I have not. Opaque white is also not a part of my painting vocabulary because to me it is visible in reproduction and can be easily detected as the paper and pigments age. However, erasers, razor blades, and on rare occasions, patching are definitely within my problem-solving vocabulary.

For me, the most successful watercolor painting is achieved with only one layer of pigment, which must remain transparent—not repeatedly noodled or overworked. A successful painting must have presence, guts and a combination of sharp and soft edges. In a good watercolor, the paper is visible and plays between the positive and negative shapes. Both the whites and the darks form value patterns that flow through the entire watercolor.

I experience a definite rush when the juicy water allows one area to flow or bridge into another, and still maintain readability. There is simply no such thing as too much water. Plenty of water placed on a flat board, allows the pigments to do their magic without losing too much control.

OK, you ask, how does one make additions? For up to three layers of charging pigment in water, the painting retains its freshness. The catch is, how does one make changes, alter or subtract, rather than add? Either one's temperament allows for using the first attempt as a study and redoing the entire painting in order to maintain the excitement of the process or it does not. Sometimes this is the best approach. On other occasions, time pressures and a very clear sense of the desired result make doing a very careful tight map/drawing, describing exactly where forms and values begin and end, the best and most pleasurable way of working. Be-

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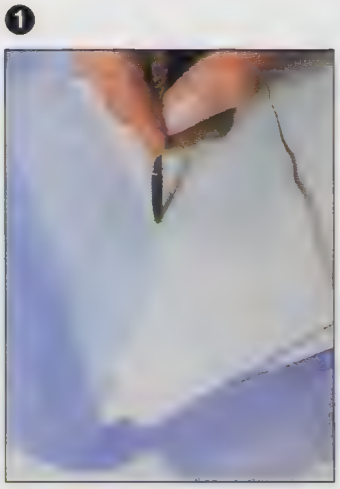
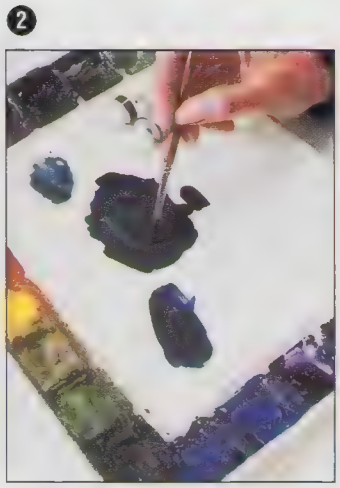
Jacqui Morgan is an award-winning illustrator, painter and watercolor instructor based in New York City. She is the author of "Watercolor for Illustration" (Watson-Guptill, 1986), as well as the featured artist in "Wet-in-Wet," (Twenty-Two Productions), a series of videotapes on watercolor. Her recent clients include Champion Papers, H.J. Heinz Co., American Express, IBM, AT&T, Citibank and others.





Drawing with Water This painting, which promotes the classified section of *New York Magazine*, is 28 x 36-inches. The large type was done by charging thicker pigment into areas drawn with water. Some of the small type was created by painting direct washes on dry paper.

1 Here I load a No. 14 brush (Prolene by Pro Arte) with clean water and actually draw the letter. I make sure to leave a thick bead of water so no area will dry before the letter is painted. It is best to dip the brush anew for each letter so they remain thoroughly wet. Make sure previously painted areas are thoroughly dry, or anything painted over it will have a soft, fuzzy edge or will seep uncontrollably into the previous layer.

2 Because the color I mix blends with the water, the pigment needs to be loosened but viscous. If I add too much water to the color, when it blends with the water on the paper, the value will be too light. In this case, my color is a mixture of Winsor blue and indigo.

3 I then charge this pigment into the bead of water. Hopefully, it will distribute itself somewhat unevenly so the letter is readable, but has the appearance of watercolor.

4 When there is insufficient flow of pigment in the bead of water, the board can be tilted. If the area is not wet enough, more water can be added to the pigment to make it move. However, I never try to repeat the initial stroke made with water because the gesture becomes stilted and loses its freshness and gesture.

cause I am free from crucial decisions, I am most apt to gamble–to allow the water and pigment to do what it will. Oftentimes, the most spontaneous and exciting paintings result from this method.

The following are some problems I always encounter with watercolor, along with demonstrations and suggestions for how they can be solved. Watercolor, the problem, is for me also the solution because without my help, it creates its own magic.

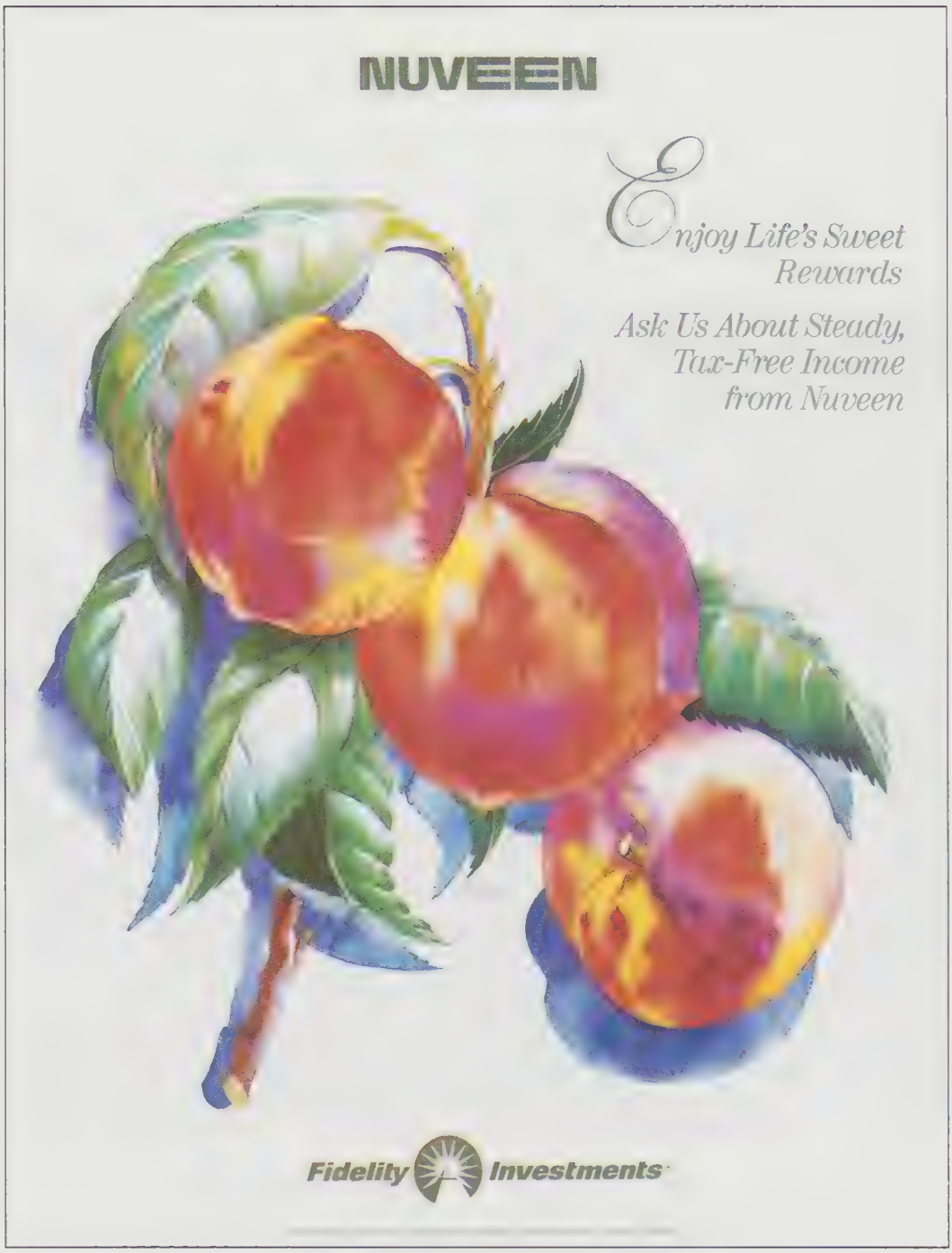
DRAWING LINEAR FORMS WITH WATER

Watercolor is at its best when it is describing forms. But when it must be used to render fine tree branches, fences, telephone poles and other linear forms, the result can often be lifeless and inconsistent with the balance of the painting. The primary cause of this problem is that the line or form is applied directly to dry paper in order to prevent spreading.

There is, however, a way to describe linear forms with control and maintain a consistent watercolor quality. Instead of mixing color and painting it on dry paper, it is better to first draw the forms with clear water on dry paper and charge (or float) pigment into the wet surface. The spontaneous blending of water and pigment maintains a freshness not possible with premixed color on dry paper. This method works especially well for typography, as the following example demonstrates.

Photos by Marianne Barcellona

Blending Color All of the peaches, the stems and leaves in this poster for Nuveen Fidelity investments were painted by charging pigment into wet paper and allowing the colors to blend.



BLENDING BY CHARGING COLOR INTO WET PAPER

Unlike other media, watercolor leaves hard, nearly immovable edges where it dries. Because of this natural phenomenon, I often find it easier to float all colors into a shape while it remains wet. This way I can maintain control over bleeding colors because the water is confined to one area. Because I apply the water to an area immediately before painting it, I know just how the pigment will spread. This is less chancy since I have greater control over the final results.

While a shape can be re-wet after it has dried and another color floated into it, it is fresher looking, more fun and faster to do it all in one step. The following demonstration, which shows how I painted a peach used in posters and ads for a financial investment company—illustrates this basic principle of my approach to watercolor.

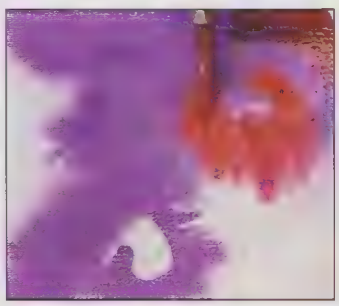
1 My first step is to wet the entire surface of the peach "map" with water, except for a specifically delineated area around the stem, which stays dry until the final step. Using a series 500 one-inch flat lettering brush (Holbein) enables me to fill the area more quickly so that the surface stays wet longer, giving me more time to manipulate the pigment.

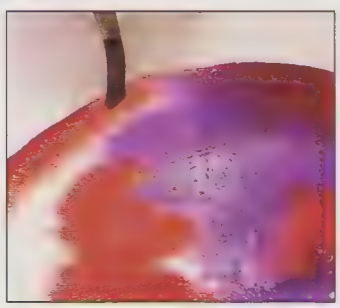
2 With the same brush I charge violet into the wet area. Violet will be the coolest shadow color in the peach. Note how the color blossoms where the pigment hits the wet areas. It is important when mixing color to use a lot of pigment because when it blends with the water on the paper, the value will be lighter.

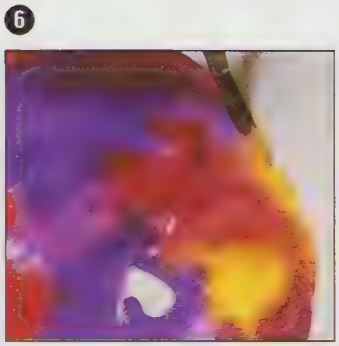
3 Using a No. 10 round, synthetic brush (Prolene by Pro Arte) and more pigment, I spread a darker violet into the dry area around the stem where I want it to be deepest in value. If painted on dry instead of wet paper, the color would dry to a darker value.

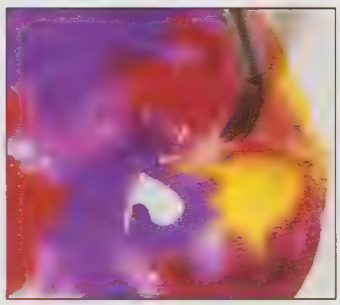
4 With the same No. 10 brush, I charge in vermillion and magenta. The new colors mix together and blend with the still wet violets. The natural blending properties of watercolor create colorful textures and "accidents" that give the work visual excitement.

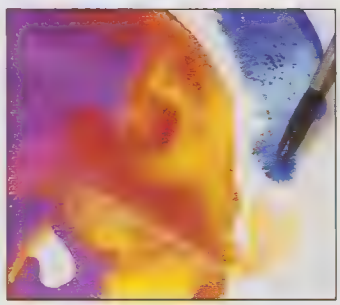
5 Next, I charge vermillion into the edge of the peach. A hard edge forms next to the dry area, but the pigment also spreads upward into the still wet area creating soft edges near the violet and white.

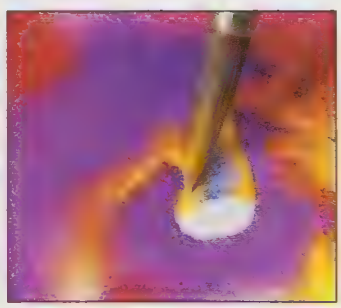












6 To give the peach a local color, I charge permanent yellow deep along the edges, which immediately blends with existing colors in the wet areas. Remember that the initial application of water must be very wet in order to achieve this natural blending.

7 In order to pick up unwanted color in the wet areas, I thoroughly dry the No. 10 brush I am using against the dense layered ends of a roll of tissue. Another method is to place the hairs of the brush between your index finger and thumb and squeeze out all the water.

8 Once the brush is dry, I place it on the area that I want lighter and roll it on its side to pick up the excess pigment and water. It is important that the brush be free of pigment, especially if you are picking up a different color than you just painted.

9 After the bottom edge of the peach has set (is semi-dry), I wet the cast shadow area with clean water. I work from the outside edge of the cast shadow into and up to, but not yet touching the peach edge. Again, working from the outside in, I charge the blue into the wet area. At the last minute, I allow the blue to touch the semi-dry edge of the peach. This will create a soft edge, which not only suggests reality but creates a less cut-out, more entertaining set of edges.

10 In order to maintain hard edges for the stem, I wait for the painting to dry thoroughly. Then, using a No. 8 round, I lay in purple to represent the shadow side of the stem, followed by yellow for the stem's lighter edge. The two colors blend naturally to suggest the light-to-dark/warm-to-cool gradation of the stem.

Transparency/Reflectance In the completed illustration, note the brass scale is clearly a metallic surface, but it is not as shiny as the glass jars because the edges are soft and there is less contrast between the lights and darks. This illustration was painted for a brochure, one of a series for the investment company, TIAA-CREF.

1 My first step is to lay a thick bead of clean water onto the precise drawing. With the reference photo in close view, I make sure to keep dry the areas that are to remain white.

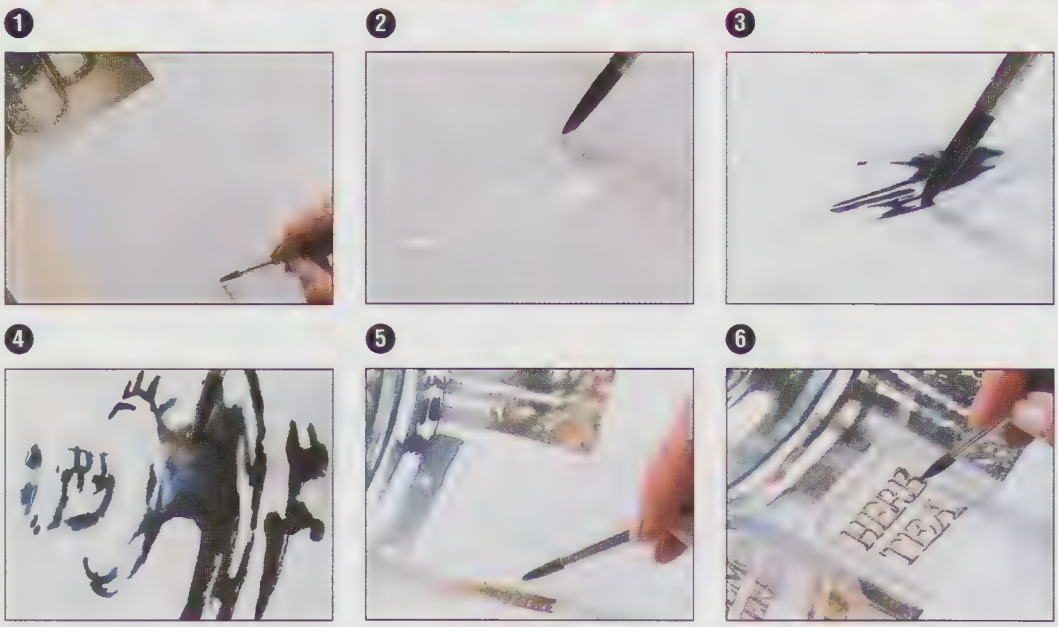
2 I apply the water liberally. The more water, the more time there is to charge in more than one color.

3 Once the area is thoroughly wet, I charge indigo into the bead of water. Indigo is a dark, but transparent, cool color that says "glass" in shadow areas.

4 Next, I charge a rich dark brown into the indigo. This warm color picks up reflections of the tea as well as the warm browns of the shop. It also provides contrast with the white paper and suggests transparency.

5 After I apply more clear water to the front of the glass jar and dab water onto the bottom and sides where the tea will appear, I charge a lighter, golden brown color into the area. The carefully placed shapes and contrast of dark against light and warm against cool begin to read as a transparent surface.

6 To heighten the contrast, I add the final darks and a wash of color to the label. Finally, I complete the label lettering and border by floating color into letters drawn first with water and by applying direct washes.

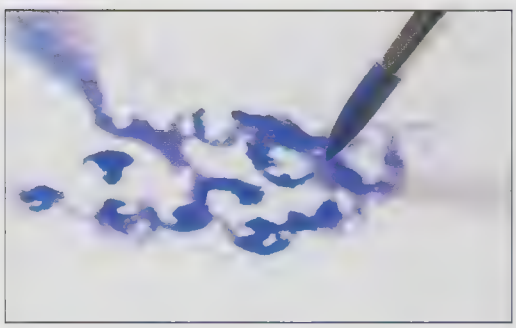


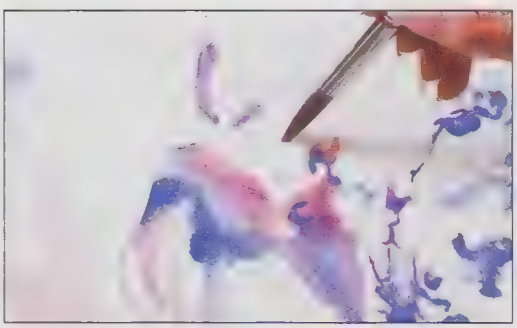
PAINTING TRANSPARENT AND REFLECTIVE SURFACES

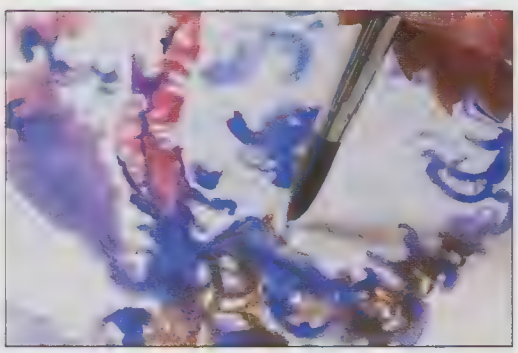
Regardless of the medium, it is always a challenge to convey "transparent" and "shiny" on a two-dimensional surface. These surfaces always have dramatic contrasts; that's their nature. When rendering these forms in watercolor, it means using lots of white paper surrounded by areas of dark. Moreover, transparent, unevenly distributed watercolor works almost magically because shiny surfaces are usually glass, metals, water, plastic or satin, all of which tend to have interior shapes that have a liquid appearance. This look is well-suited to floating pigments into water; it's what the medium does best.

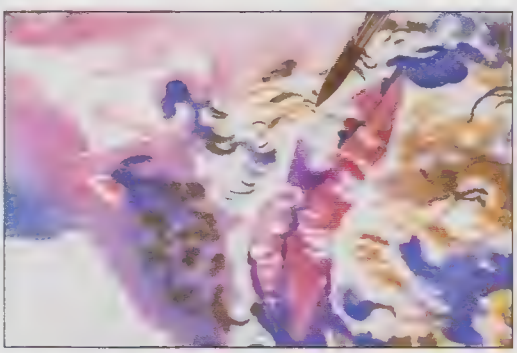
Besides having a see-through quality, glass catches light. But it is illusive. We see dark areas on some of the edges, yet other parts disappear. Our memory of the form seems to hold the shape together. Like glass, metal has dramatic value changes on the edges or planes as well as fluid and abstract shapes. Similarly, the darkest darks are often found closest to the brightest highlights. By studying these forms, you can more accurately suggest the desired effects.

In this demonstration, from an illustration of an old-fashioned coffee and tea shop in Greenwich Village, the glass jars containing tea retain their high shine, but the brass scale is somewhat scratched with use and therefore retains less of the dramatic contrasts than a recently polished surface.









Layering Texture & Dimension In the final reproduction, you can see how the transparent underwashes blend in with the texture of the beard to create a whole. Some areas of the finish are very successful; other areas more opaque than I would have liked.

1 Over a tight drawing of the face and beard indicating where shadow shapes will fall, I laid in water with a No. 12 round brush (Prolene by Pro Arte). Then I charged cool blues into these shadow areas, letting the color flow from the face to the beard. The ultramarine blue has the disadvantage of not flowing as readily as other blues, and it stains the paper too rapidly to blend easily with the other colors. However, the cools alone define the form.

2 While the area is still wet, I charge the warm skin tones into the cool colors. Occasionally I extend previously wet areas into dry ones to make the drawing more precise. In some spots, I may add deeper color or value. Also, I continue to put down more water before charging in pigment.

3 To suggest the texture of the beard, I paint tiny water squiggles, then charge in browns and golds to suggest the local colors of the beard. I also paint some curly marks in dry areas and connect them to wet areas so the color can flow. I use various browns because hair is never a uniform color.

4 To add the lighter, finer hairs, I switch to a No. 6 round, synthetic brush (Holbein). Instead of painting water first, then charging in color, I paint directly on the dry paper.

LAYERING TEXTURE AND DIMENSION WITH WATERCOLOR

In painting, we are often in conflict when we want to render a texture that must be a convincing part of a three-dimensional form. This is especially true when painting the human body, most notably, hair and beards. We may want to suggest the coarse feeling of tightly curled hair, but we want it to be part of the form of the head instead of appearing as if it were simply a pasted-on piece of graffiti.

This can be more difficult to achieve in watercolor because the beard and/or hair must be painted together with the head to avoid any unwanted edges. The trick initially is to work the whole piece wet, then blend the washes used on the face with the washes and staccato strokes used for the hair or beard. If you think of these forms as areas of color laid on top of each other instead of a "face" or a "beard," it's easier to create a convincing whole. In this example, I layer the washes on the face before adding the textural beard.

Hard Edges/Soft Edges This painting is a study in dramatic sharp edges and fuzzy, blended edges. Notice especially the hard edges on the noses, lips, chins and where the light meets shadow. In contrast, the soft edges can be seen where hair meets shadow and on the shadow areas of the eyes and noses.

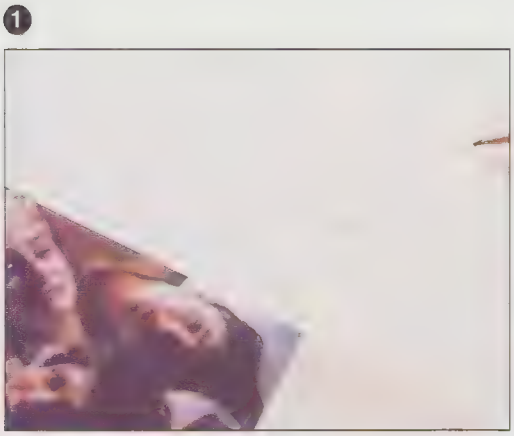
SOLVING THE PROBLEM OF HARD AND SOFT EDGES

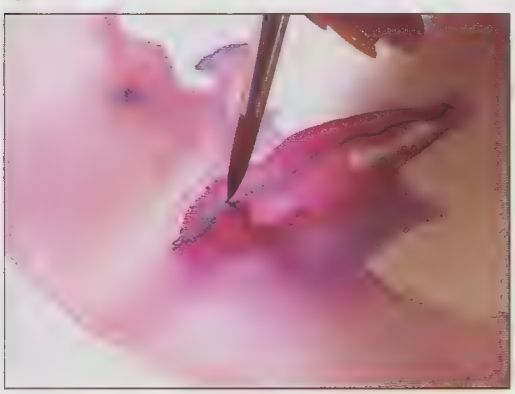
Paintings are not only more entertaining when they have both hard and soft edges, but they are closer to reality. In nature, forms appear to have a variety of edges because of the way light plays across them. Strongly lit forms seem to have hard, sharp edges, while those forms that are softly lit or even hidden from the light are more diffuse. Painters who portray nature use numerous ways to suggest these edges. With oil or acrylic paints, of course, a flick of the brush on a hard edge can diffuse it, as can a slight value or color change. With watercolor the problem is really the same, but the means for solving it is a little different.

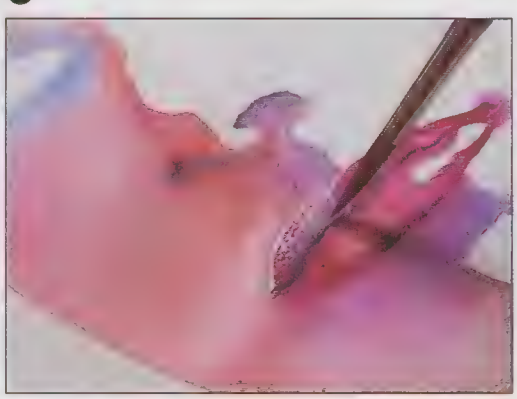
Portraying these kinds of edges in watercolor requires planning which areas you will paint with hard edges and which with soft. In watercolor, hard edges form where water and pigment stop. Soft edges form by running wet color into wet. Of course, value and color affect how hard the edge will appear. Darker, more intense forms will have extremely sharp edges, while the edges of forms with very light colors often attract little attention.

The problem of hard and soft edges can be easily seen when you study a face. With direct lighting, a face has both sharp and soft, subtle changes. Protruding elements like the nose, lips and cheekbones are seen as hard edges where light and shadow meet. Edges appear soft where the light is more diffuse.

In the following demonstration, I want to single in on one area of the face—the lips—to show how these edges can be combined to give an accurate depiction of reality. Here, the top of the upper lip appears sharp-edged while the bottom of the lower lip blends into the adjacent skin. Combining these kinds of edges gives the lips a more natural appearance.







1 With my reference photo at hand, I carefully pencil in a "map" of the face with all of the shapes carefully delineated. This helps me to plan where I will paint the hard and soft edges.

2 I first apply clear water, then float color into the shadow area of the face, making sure to bring color up to the bottom edge of the lips. But on the top of the lips I leave a sliver of white paper dry. This represents the highlight on the top of the lip.

3 While the skin area is still wet, I apply clear water, then charge red pigment into the lower lip so that it touches and bleeds into the skin area below it. This creates a soft blurry edge between bottom lip and skin.

4 To paint the upper lip, I maintain the thin dry area of separation at the top of the lip and create a new one between upper and lower lip. After floating water into the upper lip, I charge a pale, dense red into the area.

5 To create the midtone value of the lower lip—located in the center of the lip—I add clear water to allow the previously charged darks to thin and spread out. This lightens the value. Note, too, that I have left hard-edged highlights on the right side of the lips. The top one will eventually be painted.

6 When both upper and lower lips have dried slightly—they are now damp instead of wet—I paint a thin, precise line of blue into the dry sliver between the two lips. Because the lips are damp, the color spreads out slightly, creating a softer edge.

7 Next, I paint some fine blue "crack lines" into upper lips. But the lines felt too harsh because I used ultramarine blue, which stains and resists movement.

8 To soften the harsh "crack lines," I charge some clean water into the upper lip. This loosens the blue pigment, softening hard lines. ■

Surfaces and Textures in Graphite

Ralph Giguere demonstrates how he creates tonally complex renderings of hair, skin, cloth, feathers and plastic using graphite as his only medium.

By Rebecca Parks Barnard

Sparingly armed with just a pencil and eraser, Ralph Giguere has taught himself to conquer the impossible: to create, using nothing but graphite, a loyal impression of everything from fur to plastic in a near-perfect illusion of the texture, tone and depth of any surface presented to him.

In the following demonstrations, Giguere isolated textures from five of his illustrations to show how he uses variations on his basic approach to render all of his work in graphite.

"I love the challenge of surfaces. It's fun to see what you can make the graphite do," says Giguere. "Yes, I think it's easy to work in . . . it's extremely flexible. I can push it pretty far tonally and still be able to erase—

(Continued on page 64)

Feathers "The Silver Doctor," an illustration for the *Hartford Courant*, is a study in edges, patterns and subtle value contrasts. Feathers, says Giguere, do not have just a flat value. In the dark areas or in the highlight areas, there are subtle lines of light that give that characteristic feathered edge.

1 Giguere works from a small sketch in which he has detailed the composition and predetermined the full range of tonalities. He then transfers this to his 140 lb. watercolor paper by eye alone, using no projection equipment. Here Giguere pays attention to how the patterns interact with each other.

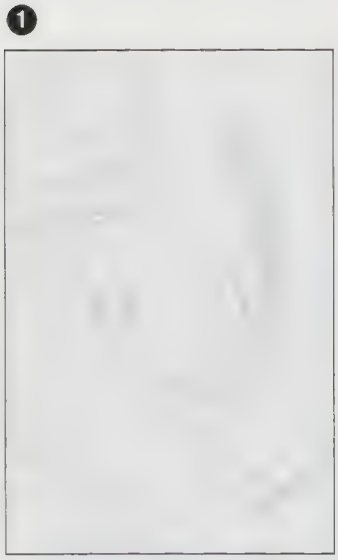
2 After the drawing is complete, he blocks in the tone in his usual way, using an A.W. Faber Castell HB pencil for the middle grays. He goes over the area again, eliminating light spots until the tone is as even as he can make it at this stage. The dark lines on the edges indicate where the dark background will meet the soft edges.

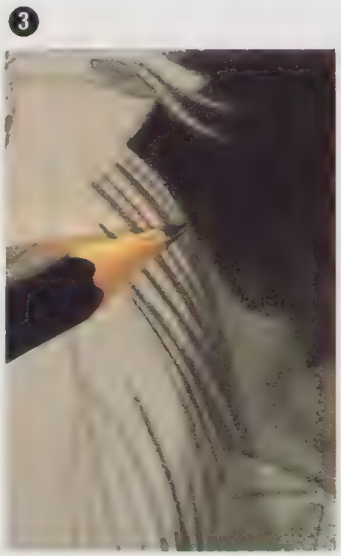
3 The needle-like whites of the lightest feathers are achieved by working the ground around the white of the paper. With such dark black, applied with a soft, staining pencil (2B to 6B), Giguere could not count on his eraser to bring the lines back to white. So he chooses to work on the negative image around them.

4 After creating darker patterns and shadow areas in the feathers, he blends a light application of graphite for the shadow area of this white feather. The edges take on different values and textures.

5 To render an area of long-haired fur, Giguere lays in and refines a light gray value with his regular technique, then makes swipes through the tone with the flattened edge of a slightly dirty eraser. (The older the eraser, the less graphite it will pick up.) He then goes back in with a very sharp H or HB pencil to push and pull the light and suggest individual strands.

6 After working out a smooth gradation of tone in the delicate white feather, Giguere adds linear details with his H pencil. As he completes the details, making sure to lighten the value on the edges slightly, he protects the graphite from smearing by resting his hand on a mahl stick.





FEATHERS

Feathers appeal to our eyes and our sense of touch. We are so visually struck by their soft sheen, sensitive edges and variety of tones that our immediate impulse is to touch them, to verify what our eyes have experienced.

To render feathers on a two-dimensional surface is really a problem of edges and how they interact with the background and other objects in the picture. In fact, Giguere describes an illustration of feathers he completed as "a piece about edges." Explains the artist, "Feathers do not have just a flat value all the way to the edge. In the dark areas or in the highlight areas, there are subtle lines of light that give that characteristic feathered edge. The edges had to be crisp and clean, but soft."

Photos by P.K. Trace

Fabrics In "General Miles," Giguere confronted three different kinds of fabric: the dress uniform, the satin-like jacket liner and the velvet collar. The collar was rendered with dark blacks and low reflected light. The jacket and the lining have the same basic value, but the lining has brighter highlights to suggest a fabric with more sheen.

1 First, he begins blocking in the first layer of graphite with an HB pencil. At this early stage, he is simply blocking out light and shadow areas.

2 Giguere works into the fabric slowly, continually redrawing in the static areas. To get the blackest blacks, he uses a 2B pencil initially, but in the last stages he uses a 6B.

3 With the shadow and velvet collar blocked in, he moves next to the uniform, creating a gray tone half as dark as the collar.

4 Giguere finishes the basic block-in of tone. The sheen of the coat is suggested by subtle highlights. The lining is blocked in with the same value, but the highlights will be brighter to suggest the sheen of the satin-like material.

5 The edges of the collar are far too bright, so Giguere goes over them with a B pencil, toning down the value.

6 After blotting up graphite on the collar to suggest a worn spot, using a B pencil, the artist softens the edges (top), then picks up more subtle lights with his kneaded eraser twisted to a point (bottom).

FABRICS

Whether it is coarse burlap, shiny satin or plush velvet, all fabrics have their own textures. In order to render them convincingly, it's wise to study them under controlled lighting. The way the fabric absorbs or reflects light will help you understand the overall midtones, and most importantly, where to place the darkest darks and the highlights.

An illustration called "General Miles," for the *Boston Globe* required rendering a satin-like lining as well as a velvet collar.

By studying the velvet surface, Giguere discovered that reflected light gives the fabric its character. "What makes it look like velvet is that the reflected light at the top and bottom edges is very dark. That's what velvet does; it really absorbs a lot of light. So the reflected light is very low."

Skin and Hair In "Lily," Giguere focuses on skin and hair. When rendering these surfaces, details drawn with very sharp pencils become as important as tone. Because this is a balancing act, "the drawing stays in flux until the end," says Giguere.

1 Knowing the image would evolve as he set about perfecting its tonal quality and details, Giguere's initial drawing, a simple representation of line, is sketchier than normal.

2 Giguere roughs in middle tones first using an HB pencil. This is a simple demarcation of light and shadow. Note that Giguere puts emphasis on the edges of the fingers since these will be the darkest areas of the skin.

3 Using a B pencil, he blocks in the darkest tones for the hair and the shadow areas between the fingers. Within the strand on the left, he retains several lighter areas to indicate variations in hair color and the overall pattern of light.

4 Once Giguere establishes overall tone and texture for the hands, he uses a cotton swab to blend the graphite, then picks up any unwanted dark spots with his kneaded eraser. Giguere sometimes tears and retwists the swab into a smaller point when blending details. "I use the Q-Tip as a drawing tool, in the same direction as I applied the graphite. I start at the edges with a little more pressure, lighter in the center to create more form."

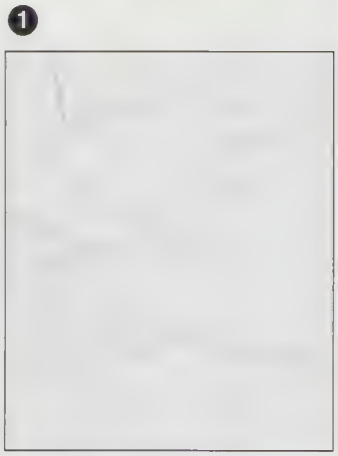
5 Here is where the drawing continues in the refinement stage, as Giguere perfects the tonal gradation and draws the lines in the knuckles and the creases in the skin to finish the fingers.

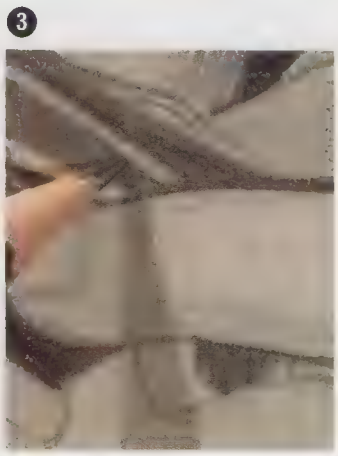
6 Using sharpened HB and B pencils—HB for the most delicate strands—he draws individual strands at the edges of the tuft of hair. It is this kind of detail that helps Giguere convince his audiences that this tone is a tuft of hair.

SKIN AND HAIR

In a quest to capture skin and hair with his pencil, Giguere relies on detail as much as tonality to suggest the textures he seeks. The drawing of the hands is especially delicate, with careful attention to the subtlety of knuckles, joints and fingernails. For the hair, he establishes an overall tone, then works and reworks individual strands with his kneaded eraser and pencil, allowing each lock an autonomy that makes it believable. "In the early stages," notes Giguere, "I'm looking for volume and form—I'm constantly going after the hair."

An image Giguere originally conceived to illustrate an *Atlantic Monthly* story about a vain woman whose hair is brutally cut demonstrates the principles of marrying tone with delicate detailing.





Glossy Surfaces In "Night Sport," Giguere's job was to create a convincing portrait of a plastic leg prosthesis. To do that he contrasts an ultra-refined, dark ground with reflected light and a brilliant highlight that reads "glossy."

1 Giguere's initial drawing indicates the basic contour lines as well as a slight indication of how the light and shadow will break. As in all of his work, pattern is an essential element.

2 Deviating from his normal method of gradually building up darks, Giguere immediately blocked in the darkest darks because the image contained so many clean, simple lines.

3 To create an overall tone on the legs, Giguere starts with an HB pencil, but then goes back into the tone with a softer 2B pencil. He has found that the HB is more easily erased and therefore more flexible than softer pencils, which stain the paper.

4 Using the same HB pencil, Giguere incorporates some added modulation to make the forms "turn." He also makes sure that areas on either side of the central leg are slightly darker.

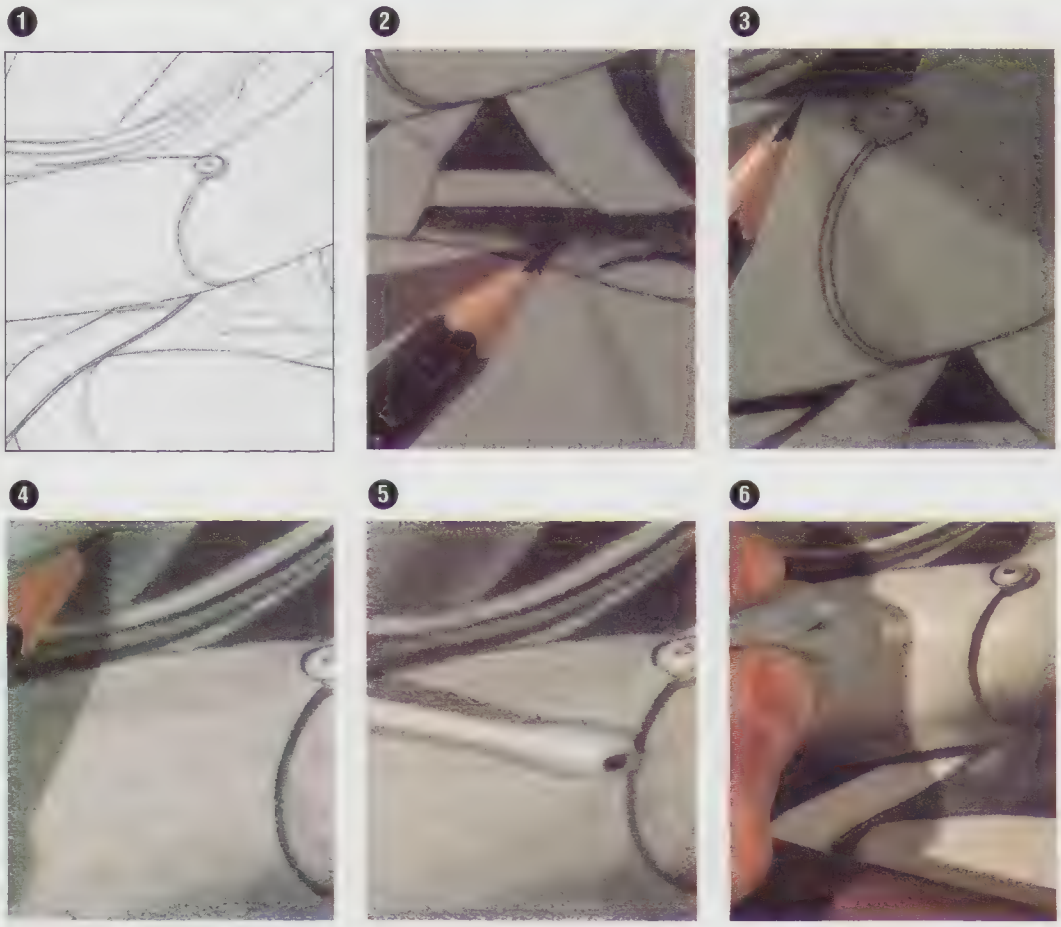
5 In the light areas of the central leg, Giguere uses a swab to blend the graphite. Notice how it creates a smoother texture and slightly darker value. It will lighten when he goes over the area with a kneaded eraser.

6 Once he is pleased with the overall tone, he creates the important highlight on the leg with a clean kneaded eraser flattened into a spatula shape. He then softens the edge of the highlight with an H pencil.

PLASTIC

Rendering a glossy surface in graphite requires a marriage of a fine background tone with the illusion of reflection. Giguere accomplishes this through a combination of an ultra-refined dark ground, reflected light, secondary highlights and one vivid highlight.

For this illustration of a plastic leg prosthesis for an *Atlantic Monthly* short story, Giguere deviated some from his normal technique. "Usually I have to build gradually to the darks; this time I was able to get the darkest darks down, since this was all very hard stuff with clean, simple lines. I was more aggressive because of the clean divisions between lights and darks. Once you go to black, it's tough to move any lines; you can't go back into the dark areas with a light value. I could measure tones, base them on the blacks."



Background Texture To give an aging window sill qualities of tone and texture unique to an old painted surface, Giguere opts for a warmer, more open graphite texture.

1 Again working from a small tonal sketch, Giguere transferred the lines onto watercolor paper.

2 Using an HB pencil, he blocks in the middle gray ground using repeated diagonal strokes. He goes over the area again, eliminating light spots until the tone is as uniform as he can get it at this stage. Next, he will evaluate where to adjust the tones.

3 With a softer B pencil, Giguere adds another layer of pencil to the darker background of the weather-streaked window, purposely leaving the coarser strokes visible to give the area a more organic feel.

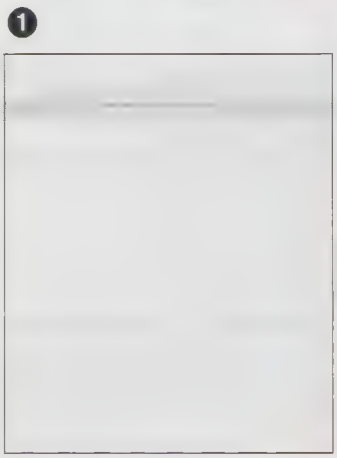
4 The refining begins with the careful manipulation of a cotton swab to blend the graphite onto the paper. He moves the swab in the same direction as he applied the graphite.

5 After the tone is as smooth as he can get it using pencil and swab, Giguere constantly twists his kneaded eraser into a point and with incredible meticulousness, goes over the entire tonal block to pick up dark spots—about one every millimeter. Where he takes out too much tone, he replaces it using a very sharp pencil.

6 For the illusion of snowflakes, Giguere again seeks to create an organic look. Using the kneaded eraser, he makes random blots on the dark ground, then goes back in and lightens some and darkens others to suggest depth.

BACKGROUND TEXTURE

An accumulation of paint and years of dust give an aging window sill qualities of tone and texture unique to an old painted surface. To achieve this look in a Christmas card illustration, Giguere stops short of refining the grain into a superfine sheen, leaving instead a more open graphite texture. The pebbly quality of the wall comes in part from blending and picking up excess darks with a kneaded eraser.



(Continued from page 58)

sometimes back to white, almost all the time pretty close to it. I just like the idea that you can push it and pull it, applying it and removing it, back and forth and back and forth, until you get something to be where you want it to be."

But there are frustrations, notes the artist. "One of the things that drives me crazy about graphite is that it is at times one of the easiest mediums to reproduce, and at other times it's the most difficult. It's nightmarish what can happen to it because of the reflectivity. It's really dangerous when you have a large black area and get someone who's inexperienced at reproducing it. Blacks will reflect light, and you end up with light spots."

He refuses to use related media like charcoal because he says it looks foreign. "It is too jet. I can't get the transitions from black into darker grays into middle grays as clean."

While he learned other techniques at the University of the Arts in Philadelphia, he is entirely self-trained in graphite and has come up with his own methods of refining his work. The cotton swab technique he uses for blending is one example of the innovations born of his innocence; his unique use of various kneaded erasers to create smooth, even surfaces is another.

PROCEDURE

There is common groundwork in all of Giguere's pieces. He relies on a basic flat middle gray tone to represent many surfaces, and lays this in exactly the same way each time. It is in the refining stages that the textures come alive. For example, after applying a basic tone over the entire drawing, Giguere blends the entire surface with a cotton swab, trying to create as even a surface as possible. "Then I stare into the whole field of values and try to pick the most common value. Anything darker than that I lighten up; anything lighter, I darken." Giguere lightens the drawings with a kneaded eraser, molded into a shape that works with the particular area in which he is working.

CHOICE OF PENCILS The artist works with an entire range of pencils from 2H to 6B. The only brand he uses is Faber Castell because he feels it is the most refined graphite available. "They flow very smoothly and aren't granular," he notes.

His most common tool is the HB pencil because he can work into either darker or lighter areas from it. H and B are his other pencils of choice because he can still work into a broad range of tonalities from them. "I could probably complete an illustration with those three pencils," he says.

Hard pencils, like a 2H, are used to create the subtlest grays in light areas like flesh. Following an initial application of HB, Giguere goes over the surface with the hard pencil to knit the tones together.

The blackest blacks in his illustrations are usually created with 4, 5 or 6B pencils. "When you are working in that range, you are really committed," he emphasizes.

Giguere uses a pencil holder not only to get extra mileage from his pencils but to ensure he is applying the graphite with a light touch. "For light areas like skin, I would be holding the pencil way back to create the subtlest touch. Basically, I use it for control."

Giguere works on 140 lb. Fabriano hot press watercolor paper. "It's a heavyweight paper like a drawing paper, but not too slick," explains the artist. "I can beat the heck out of it with my erasers, and it survives." Giguere blends graphite with Q-Tip brand swabs, which he prefers because they are 100 percent cotton and work well with the rag paper.

RECONSTRUCTING REALITY In his work for *The New Yorker* magazine, Giguere renders a weekly cityscape teaser designed to keep savvy readers guessing. In that assignment, as in most of his work, it is his job to reconstruct reality into a graphically pleasing piece. In that respect, the artist is as much a conceptualist as a draftsman, deciding which elements to eliminate or enhance.

No realistic artist can escape comparison to photography. To the inevitable "why bother?" questions, Giguere explains that his work is often a composite of real elements, with parts added and subtracted as directed by the client, and his own sense of composition.

Besides, he explains, "I don't think they are photographic. They have a surface that isn't a photographic—it's a graphite surface."

Giguere is an artist who has found his niche. His pristine studio in Glenside, Penn., houses not much more than a 50-year-old oak flat file, a simple wood drafting table, pencils and an old brass sharpener (electric sharpeners don't provide a true point, he says), an assortment of kneaded erasers and a box of cotton swabs. (Although the kneaded erasers are primary tools, when he has to make major adjustments in a drawing, he uses an assortment of hard, rubber erasers.) Messy tubes of paint are hidden away; one of the requisites of his meticulous work is to keep things like paint and dirt far from his immaculate pages.

The 33-year-old artist delights in a new challenge and has tackled hundreds of new surfaces with the energy of a master inspired by the opportunity to improve his game. Some of his most interesting textures include the muted gloss of a plastic leg prosthesis, the braid of a woman's hair, and the thick softness of black velvet. No telling what he might tackle next. ■

Rebecca Parks Barnard is a freelance writer based in the Philadelphia area.

STEP-BY-STEP

Preparing Textured Boards

C. Michael Dudash uses modeling paste, matte medium and torn paper to create textures on canvas-covered Gatorfoam.

By Susan E. Davis

Like line, color and shape, texture is one of the primary tools illustrators have at their disposal to add surface interest to their work. Whether this texture is created with paint, gesso, acrylic medium or a computer software program, it is one tool that 20th century artists have embraced with passion.

C. Michael Dudash uses texture not only to create surface interest (shown above), but to give his boards an abstract structure that works in conjunction with the realistic images he paints. (Refer to "Spicing Up Oil Washes," in this issue.)

In this article, Dudash demonstrates three of the techniques he uses when working with oil paints. What makes these techniques so useful is that they can be varied in any number of ways to help you achieve whatever look, feel or mood you wish.

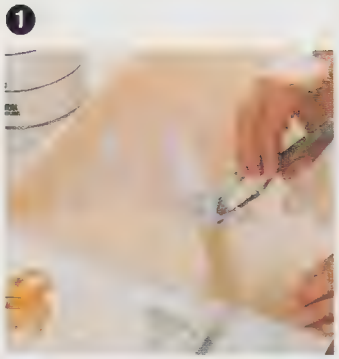
Instead of illustration board or stretched canvas, Dudash prefers to work on canvas-covered Gatorfoam (International Paper Co.), a durable foam board-like product that is infused with a polyester resin. It can be purchased in 3/16- or ½-inch thicknesses and with three different surfaces: white or brown paper or a synthetic wood veneer. "It's very lightweight, rigid and sturdy, and it cuts easily with a regular utility knife," explains Dudash. "It stays very flat when you laminate linen or whatever else to it and when you paint on it. It's very easy to work with, it doesn't warp on you the way Masonite can, and it's much stronger than foam board."

Whether creating texture with modeling paste, matte medium or scraps of paper, Dudash uses Gatorfoam as his base.

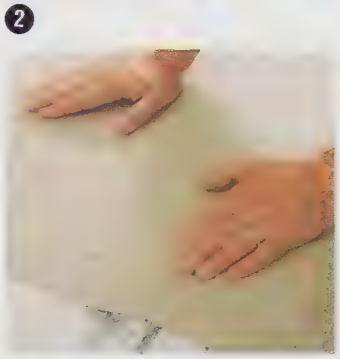
Susan E. Davis is senior writer for Step-By-Step Graphics.

Mounting Canvas on Board

1 After cutting a small panel from a sheet of 4 x 8-foot, 3/16-inch Gatorfoam, Dudash spreads an acrylic polymer medium (also known as matte medium) over the board with a brush. Instead of household glue, Dudash uses it as an adhesive to secure his canvas to the board. While the medium has a milky white appearance when it comes out of the can, it dries to a clear finish. Dudash prefers it because of its archival quality. It can also be used to thin acrylic paint and as an adhesive for making collages.



2 Dudash cuts a piece of raw linen canvas approximately one to two inches bigger than the board and spreads it evenly over the panel. Starting at the middle of the board and working out to the edges, he smooths the linen to create a uniform surface.

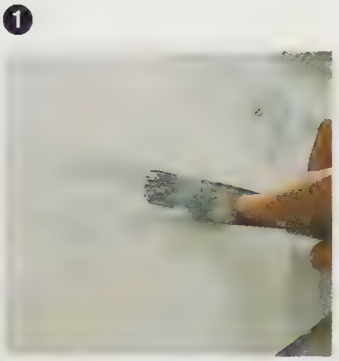


3 Once the panel is dry, he primes the canvas with three or four coats of acrylic gesso, lightly sanding each layer with 100 to 120 grade of sandpaper. "It tends to seal the canvas or any other porous surface you want to paint on. It also gives a good basic ground for any painting medium," explains the artist.

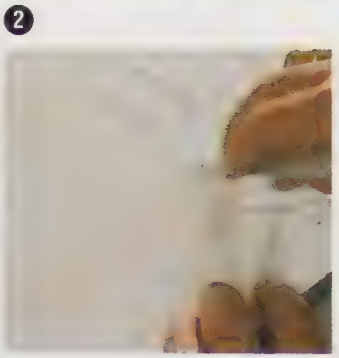
4 After the final coat dries, Dudash trims off the excess linen with a utility knife. "I have always enjoyed working on a solid surface rather than a stretched canvas," says the artist. "The resulting Gatorfoam panel is very rigid and strong, yet lightweight and it can be easily trimmed, if desired. It's also easy to frame and ship."

Textures with Modeling Paste

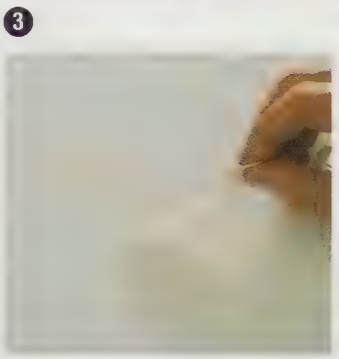
1 Dudash first masks off an area of his board with ¾-inch masking tape, then works quickly as he applies the acrylic modeling paste with a putty knife. When the modeling paste dries, he will pull up the tape, leaving a simple, abstract pattern. Although water can be used to thin the paste to any consistency desired, Dudash applies it directly from the jar with a minimum of dilution.



2 To create a different textural look, Dudash switches from a knife to a scrap of poster board to manipulate the paste. For a few finishing touches, he uses a palette knife. "I work very quickly to achieve a spontaneous feeling," he says. "A lot of it will disappear anyway, so there's no sense in trying to contrive it."



3 When the paste starts to set, Dudash pulls up the masking tape, revealing a strong abstract pattern. Once the paste is thoroughly dry, in about five minutes, he sands the surface, further refining the final texture.



4 Using a wide brush, Dudash applies Winsor & Newton burnt sienna and ultramarine deep blue oil paint directly from the tube onto the board, thinning them slightly with pure odorless turpentine. Because he wants just a tint of color in the underpainting, he wipes off most of the oil wash with a paper towel. "You can leave a lot of paint on or wipe most of it off," he says. "It can be altered in a million different ways."

5 Here is the final board textured with modeling paste and tinted with a light oil wash. Notes Dudash, "This wash dries quickly, which allows me to paint on top of it directly or to seal it first with a varnish or spray fixative, as I generally do."

Photos by Glenn Moody

Textural Surfaces with Paper

1 Another way to create a painting surface that will add interest to your work is by applying various types of paper directly onto the canvas, notes Dudash. "Here are four types of paper that I have used with success: [from left] watercolor, rice, regular white vellum and paper towel." (He uses Bounty brand toweling because "it has a neat texture, almost like old snakeskin.")

2 After laying down several strips of masking tape, Dudash secures pieces of torn paper on the board with acrylic polymer medium. Working quickly, he covers the board with another layer of the polymer medium to seal the paper. "The final wash will be affected by the amount and location of the acrylic medium," he instructs.

3 Next Dudash adds tape to create additional patterns in the paper, but he decides he doesn't like some of the pieces of tape, so he cuts into them with a utility knife and removes them. Finally, the board is ready to be painted.

4 After covering the board with an oil wash, Dudash removes some of the paint with a paper towel. "In this instance I added some turpentine to the towel to remove even more of the paint because I didn't want such a heavy stain on the paper," he notes.

5 After removing the remaining pieces of masking tape to reveal a white geometric pattern on the board, Dudash finds the white areas are too bright. So he uses a soft blending brush to spread some of the still wet color into the white areas.

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Textures with Matte Medium

1 Another way to create texture on a linen board is by applying acrylic polymer (matte medium). After Dudash spreads out the milky medium on the board with an old, stiff brush, he creates texture with a palette knife that has a serrated edge. "Once the medium is on the board, you can swirl it around, rub it, make brush strokes or any kind of particular little pattern," he notes.

2 The final texture dries quickly. "It's quite subtle compared with the previous application of modeling paste, but it leaves an interesting texture, which becomes more apparent once an oil wash is applied. Dudash adds that this technique also works well on cold or hot press illustration board or watercolor paper.

3 After covering the board with a wash of oil paint made up of burnt sienna and ultramarine deep blue, Dudash wipes off some of the paint with a rag and then goes in with a wide, stiff brush to further expose and exaggerate the subtle patterns.

4 Dudash uses dark color for these initial washes in order to "allow the most intense color to remain in the valleys and cracks, with the high points wiped back to a much lighter value." Again, the board can be worked on as soon as it dries, or a coat of varnish or spray fixative can be applied. ■

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Spicing Up Oil Washes

C. Michael Dudash creates luminous effects in oil by applying thin washes of color over a variety of textured surfaces.

By Susan E. Davis

The oil wash has been a staple illustrator's technique for more than a generation. Most illustrators have been drawn to it because the paint dries quickly, it can be easily manipulated and, like watercolor, thin washes of color create a luminous effect.

However, a new generation of illustrators brought up on the works of oil wash masters like Bernie Fuchs have begun to add their own personal touches to this much-used technique. For example, Vermont-based illustrator C. Michael Dudash uses a succession of oil washes over heavily textured surfaces. He wipes away the paint, leaving a tint of color. The textured surfaces underneath show through, helping to add interest and set a mood. Dudash then switches to opaque paint, which he sometimes blends into the washes or uses to paint details.

"I find that putting a combination of techniques together gives me a lot of flexibility in style," says Dudash. "From a technical standpoint a lot of what I do in my oil painting is not unusual. The techniques I use are just tools that let me arrive where I want to arrive with a particular image."

But that's the whole point. Having a range of techniques at your disposal is like maintaining a well-stocked tool chest. Not only does it allow you a great deal of latitude in the kinds of assignments you can take on, you don't get bored.

A prize-winning oil painter whose clients includes such high-profile names as Anheuser-Busch, AT&T, *Readers Digest*, *Time*, *TV Guide* and *Inc.* magazines, United Artists/MGM and the United Nations, Dudash agreed to create a demonstration showing these techniques especially for *Step-By-Step*.

THE FIRST WASH

Dudash prepared a 17 x 23½-inch linen board for painting by taping off the canvas into thirds and then making patterns using acrylic modeling gel at the top, polymer medium in the middle and various glued papers at the bottom. (See the story, "Preparing Textured Boards," for a more detailed explanation of how Dudash prepares his boards.)

"What's fun is that I can minimize or exaggerate the underlying patterns as they emerge in the final painting," says Dudash. "Even though I lose a lot of the underpainting when I do the actual work, it really adds a lot of character to the painting."

For the first wash, Dudash applied several Winsor & Newton colors with a 1½-inch brush and allowed the colors to mix on his board ❶. Periodically dipping his brush into a coffee can that is filled with turpentine, he worked very quickly, always willing to let accidents happen.

Once the panel was covered with paint, he wiped off the pigment with a rag ❷. "I use this tint as a neutral background color and work my darks and lights against it. It also ties together the other colors that I'm about to use," he notes.

Reflecting on the nature of oil paint, Dudash says, "Oil paint is very transparent because the medium—either turpentine or linseed oil—that it's mixed with is very transparent. People don't generally think of oil paint like that, but it has the capacity and capability to be used almost like watercolor."

DRAWING THE IMAGE

Even though Dudash admits he felt "funny" 14 years ago when he first used a projector to help draw an image, he now does portraits and other representational paintings that have to be technically correct with the aid of three tools: a Kodak slide projector, a 40-year-old opaque projector, and an Artograph MS 230 for larger work.

Emphasizing Texture C. Michael Dudash painted this 17 x 23½-inch painting using oil washes over a linen board. He prepared the board with a variety of textures including acrylic gel medium, bits of ripped paper, tape, paper toweling and matte medium.

C. M. JUDASH

Swans Dudash used modeling paste to give this illustration for *Readers Digest*'s music division a thick, painterly texture (at right). After turning in the illustration, he lightened the colors on this image, creating an entirely different look.

L.A. Raiders To give the impression of heavy textures, Dudash created brush strokes around the top of this picture with modeling paste (below). It was painted as a limited-distribution poster for the Creative Services division of Anheuser-Busch.

"Using a projector is a real time-saver; it also helps in terms of accuracy," notes Dudash. "For instance, I'm currently working on a movie poster of Kevin Costner for Warner Bros., and they want an exact, perfect likeness. Even though I learned to draw and paint from life, it would take me forever to do it by hand. So I use the projector as a tool to get the basic image on canvas with the proportions right. Then I take liberties after that."

For this demonstration, the artist took a photograph of a rose in a vase ❸. Working quickly with a 6B pencil, Dudash outlined the lower part of the image, adding a darker line in a few places with a small black litho crayon. "I didn't spend a lot of time on this drawing, although if necessary I may spend a considerable amount of time creating a detailed rendering, as I had to with the Costner portrait," he explains. "Here I plan to change all the colors in the actual painting, with the exception of the red rose and green leaves."

In order to make sure the color he applies for the rose will not be affected by the underlying tint, and to add another textural note to this focal area, Dudash adds a small patch of white paper towel primed with acrylic gesso to the canvas. He then sketches in the rose directly over the patched area and then draws the vase ❹.

The oil tint can still be removed at this stage, though it is basically dry to the touch within a half hour after it is applied. Once the tint is thoroughly dry after an hour or two, Dudash covers it with several layers of fixative (Krylon Workable Fixative). This seals the oil tint and the drawing and protects them from the layers of paint he is about to apply. *Tip: An effective and inexpensive alternative to spray fixative, especially for larger paintings is a mixture of shellac thinned with alcohol in a ratio of 1 to 4.*

"One of the beautiful things about oil paint is once it is sealed, as in a glazing process, you can paint over it and work very quickly, very spontaneously and know that what you've done underneath is not going to go anywhere," relates Dudash. "Then if you want to, you can wipe off everything you've done and you still have this initial drawing and underpainting there waiting to be worked on again. It's a very flexible, very forgiving technique."

ADDING SHADOW AREAS

On the left side of the canvas Dudash blocks in a large shadow area. He adds a "hint" of titanium white to give the color some opacity ❺. The undertextures will still be clearly visible through this layer of paint.

Dudash then adds a few light areas into the shadows and blends the colors together ❻. "Here I'm getting into some real intuitive decisions," observes the artist. "I'm not sure why I do what I do. Over the years I've been influenced by a combination of painting, experimental photography and photographic screen printing."

After loading some scarlet red paint very wet with turpentine onto a small brush, Dudash defines the shadow area around the rose, then blends the colors together ❼. As an aside, he points out, "Light is funny in real life. It will hit something and spray a little glow of color in the shadow area around it. It's a natural phenomena that tends to be exaggerated in out-of-focus photography."

The smooth gradation of color Dudash achieves is often likened to other familiar media. "Sometimes people ask if I use an airbrush," says the artist. "But I'm able to achieve a similar look with a very wet oil

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❸

❹

1 Applying paint directly out of the tube, Dudash mixes three colors—burnt sienna, ultramarine deep blue and cadmium red light—working quickly to cover the entire panel. The patterned textures he has created on the board begin to show through the washes.

2 As he wipes away the dark color with a rag, a neutral wash of color appears, highlighting the underlying textured areas.

3 After shooting this slide with his 35mm Nikon 8008 camera, Dudash projects it onto his tinted canvas, then draws a very light outline. He even used the slide as he was preparing the textural underpainting so he could be sure the various patterns would work with the final image.

4 After applying a gesso-covered paper towel to the canvas and allowing it to dry, Dudash draws with a red Prismacolor pencil and a 6B pencil, and adds a few black highlights with a litho pencil. To create a few white highlights in the crystal vase, he removes some of the oil tint with an eraser pencil (inset).

Photos by Glenn Moody

5 Working with a mixture of Winsor green, ultramarine deep blue and black thinned with turpentine, Dudash defines the large shadow area on the left. Note that he works in a slightly lighter value around the area where he will paint the head of the rose.

6 To smooth out the shadow area, Dudash switches to a blender and then a fantail brush. To add light, he also applies a few strokes of Winsor green and ultramarine deep blue mixed with white, then blends the new color into the shadow areas.

7 "I splash some scarlet red into the area of shadow around the rose," relates Dudash, "to create an aura of reflected light around the final rendering of the rose petals. This will draw attention to it."

8 Working quickly, Dudash begins filling in the rest of the shadow areas on the right of the painting using the same mixture of green, blue and black that he used for the left side.

9 Dudash begins a "new phase" of the painting: outlining the flower and shadows by removing the tint he has just applied. "Here I'm working with a brush loaded with turpentine, which is the most common method, but your fingers, kneaded erasers, paper towels, rags, sponges and so on, also work."

10 Once he is pleased with how the basic forms are emerging, Dudash zeroes in on the flower and applies a wash of scarlet red paint to that area of the painting. He then goes in with a smaller brush filled with turpentine and "picks out" the flower petals, working quickly, but carefully.

11 To define the stem and leaves, Dudash lays in a wash of Winsor green, raw sienna and white, and creates highlights with more white paint. "In some cases I remove the paint with brushes or erasers to lighten areas of detail," observes Dudash.

12 "I clean up the painting by mixing a color that will blend into the background (white paint tinted with either ultramarine deep blue or raw sienna, blended with different kinds of brushes) and get rid of things that are really distracting from the image," says Dudash. "I need to minimize some of the things I can't just wipe away."

paint and a blending brush."

Dudash now turns his attention to the right side of the painting ❽. "I work very quickly," he notes, "allowing my spontaneity to create accidents that I can use later as I finish the painting." Note that Dudash placed some predominantly green areas near the flower head that he planned to shape into leaves at a later stage.

ADDING DETAIL BY REMOVING PAINT Next, the artist begins to define the shapes of the shadows and the rose by removing the tint he has just applied with a brush loaded with turpentine ❾. "The wonderful thing about painting in layers with oil paint using a semi-glazing technique is that you can wipe off what you put down," states Dudash.

"When you've got a thin layer of oil on the canvas, you can manipulate it and fool around with it to the point of taking it all off," he continues. "It creates a particular look I like, and it's a very quick way to work. I've seen a lot of painters wipe out what's been put down; Bernie Fuchs was one of the first to perfect this technique nearly 30 years ago, but it's probably been done forever. It's really become a standard technique to remove paint to bring out the light areas and define edges."

ADDING OPAQUES Once the painting begins to take shape, Dudash switches to scarlet red and paints the entire flower area ❿. He then moves down the stem and leaves of the rose. "Here I go back to using a little more opaque paint—when you add white to oil paint it tends to make it more opaque—to define the stem and leaves," says Dudash. He creates highlights by removing paint with turpentine, a kneaded eraser, pencil eraser or with white paint ⓫. Then, using white paint tinted with either ultramarine deep blue or raw sienna, Dudash begins to remove some of the unwanted lines and textures on the original board ⓬.

One of the areas that concerns Dudash is the bottom right-hand corner. "The paper shapes have left a very distinct pattern there, as well as some spots of darkly stained accidents," notes Dudash. So he evens out the area with a mixture of white and raw sienna so it won't distract from the central image ⓭.

FINISHING TOUCHES

After standing back to assess his work, Dudash sees several areas that need more detail. One is the head of the rose. "I outline the petals with more red paint to help give them definition," says the artist ⓮.

Another place that catches Dudash's eye is the shadow area to the right of the stem. "I highlight some of the 'hidden' shapes in the original board by changing their colors slightly. Just subtle differences between various greens and blues add interest to the large flat shadow areas," he points out ⓯.

Standing back again, he finds the rose still does not stand out as vibrantly as he would like, so he creates more white highlights ⓰. "I find these touches of white draw the viewer's attention from corner to corner of the painting," observes the artist.

After working steadily and quickly for the better part of four hours, the painting is finished. "Mastering the techniques shown here enables one to work with great freedom," he concludes with a smile. "You can work tightly or loosely. You can do almost anything." ■

Susan E. Davis is a freelance writer who specializes in the graphic arts. She is senior writer for Step-By-Step Graphics.

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13 Dudash eliminates a distracting pattern near the bottom of the canvas and paints out other dark elements there because he wants viewers' eyes to focus upon the rose. To give the picture an overall solidity, he goes in and makes other areas darker and adds weight to the lower portion of the painting.

14 Dudash puts final touches on the rose with a synthetic bright brush. His purpose in outlining the petals with more scarlet red is to make the flower really vibrate.

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15 Dudash sees a way to add more interest in the shadow area to the right of the stem by exaggerating some of the shapes in the original board. He goes in with a little Winsor green and ultramarine deep blue mixed with white and slightly modifies the shapes.

16 To heighten the flower even more, Dudash uses an eraser pencil to create "the whitest line I can get around the rose." Then he puts a thin line of white paint around the flower and some of the shadow shapes for additional emphasis.

Saleable Black-and-White Techniques

The market for line art continues to be healthy. Here are the techniques you need to get in the game.

By Ken Dowd

When you examine black-and-white line art closely, you quickly find that the medium is actually a very straightforward one. Most of it is simply a series of dots, dashes and lines, used in different combinations to establish color, shape, depth and mood—a kind of illustrative Morse code.

One of the larger markets for black-and-white line art is product or food illustrations, frequently for print applications which do not have the benefit of color, such as newspaper advertising. Some line art is created for one-, two- or three-color printing for which masks will be cut, thereby adding color mechanically. And although the days of master pen-and-ink illustrators like Howard Pyle, Edwin Austin Abbey and Franklin Booth are gone, a still viable market is editorial illustration.

SKILLS NEEDED Line illustration requires a craftsman's approach. Meticulous rendering and a sharp eye for detail (not to mention good eyesight) are mandatory. If you like to work quick or loose, line illustration for product or food clients may not match your personality well.

TOOLS The tools required are simple: I use Letramax 4000 or 2000 board for final art, soft pencils for sketching, a T-square and various angles, a magnifier for close work, a kneaded eraser for picking up pencil and an electric eraser for picking up ink, and various sizes of Rapidograph (Koh-i-noor) pens. The pen size you choose should be appropriate for the artwork's final reproduction. For example, if I was rendering some art at 200 percent for final reproduction in a newspaper ad, I would choose a heavier pen point so that my line quality would be preserved in a poor print environment. In addition to ink, I also use black acrylic paint and a sable brush to render large areas of black.

TYPES OF LINE ART

There are two basic categories of line art: conversions and creations. A conversion is relatively simple: Convert a photo or transparency into a black-and-white line art version. The second category, creating a new composition, usually requires drawing from life, and it can be more time-consuming.

When I received my first conversion assignment 15 years ago, I thought it sounded easy enough: Redraw a photographed hamburger. But the meat had to look juicy, not greasy; you had to be able to see the onion, tomato and pickle clearly; and then there were all those sesame seeds to render—and all I had to work with was black and white. I ultimately solved the problem with a coquille board (which has a highly embossed surface full of tiny peaks and valleys), a technical pen, a black grease pencil, a mechanical screen, a red sable brush and white acrylic paint. What seemed to be a simple assignment turned out to be much more complicated that I expected.

The conversion process is not rote copying. The artist has the freedom (actually, the responsibility) to edit, adjust contrast, reposition elements, modify relationships, expand bleed areas and so on, to improve a so-so product or reference shot. As a result, a well-thought-out conversion can have more visual impact and interest in an ad, for example, than any photo.

The second category, creating new compositions, usually produces a looser, less commercial effect, but it takes longer and is subsequently more expensive to produce. The first step in the process is to set up a tabletop or tableau shot. If the shot is simple, I will do it myself, using an old Crown reflex press camera equipped with a Polaroid back. I use two types of Polaroid film: type 52, for halftone shots, and type 51 high contrast film, which eliminates gray values. *Tip: To shoot a colored label without wasting film trying to get a good high contrast Polaroid, take the label off the product and photocopy it. Enlarge it if there are a lot of details, then clean up the copy using ink and white paint. Reduce it to the proper size and use the copy as a replacement label in your Polaroids. The finished photo will be cleaner and sharper.*

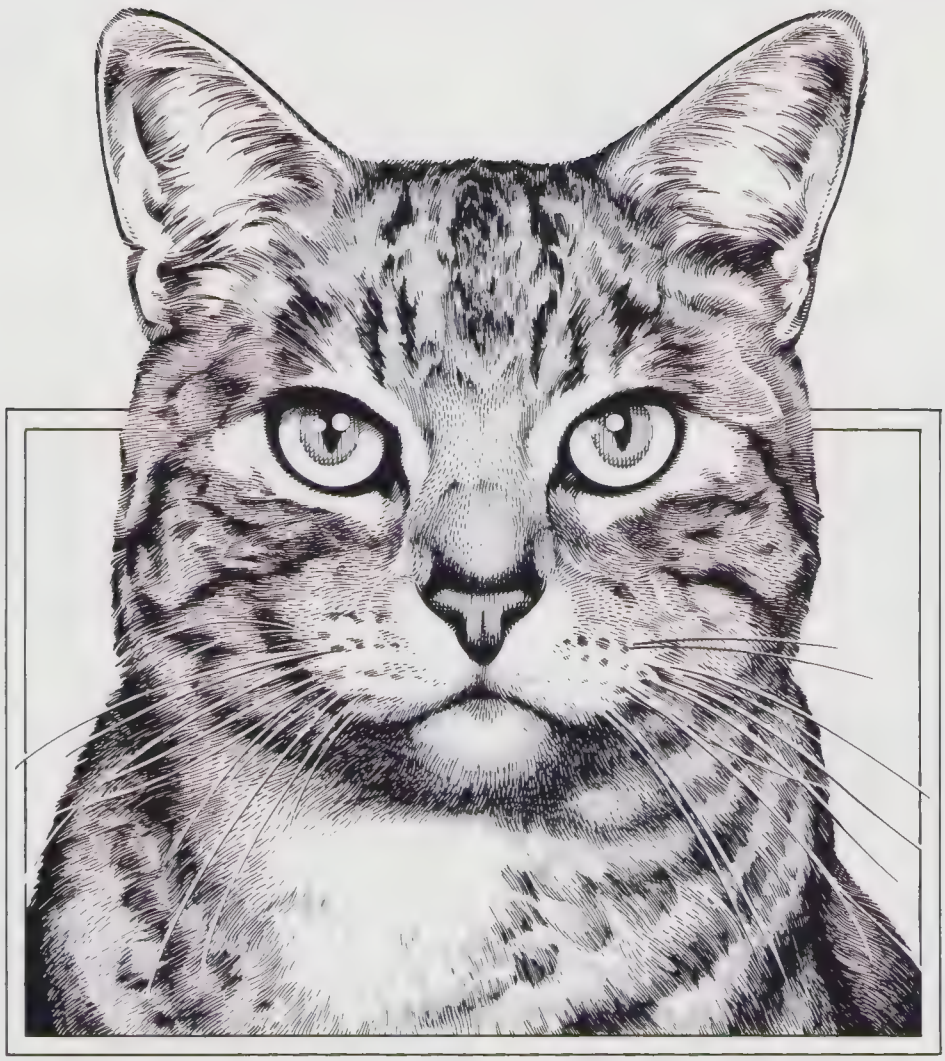
If a shot is complex, do contact a professional photographer, who will probably shoot 24 or 36 exposures so you can adjust angles and lighting. In addition, ask for close-ups of detailed areas which might be difficult to see in a wider angle shot.

Once you have your finished photos, you can basically follow the same rendering process you would use for a conversion, editing and modifying as you go.

BASIC TECHNIQUES

There are as many ways to render line art as there are line art illustrators. There is no definitive "best way," only "your way." Even so, I would like to share some of my most successful methods here. These are basic techniques which are used in all areas of line art illustration.

CROSSHATCHING Many of the techniques illustrated within this article start by establishing a value with horizontal lines. This provides a grayscale (middle range) to work



against. If there are black areas, fill them in first, then use line values everywhere else. Always preserve your light areas and let the white of the board show through, as you would with watercolor. Don't worry about errors while working on your horizontal lines; just clean them off carefully with an electric eraser.

Once you have established dark, medium and light values, you can begin to add more intermediate values. Try to see the illustration as a whole. In the largest areas of value (the grays), add either vertical or 45 degree lines using a T-square and triangle. (I prefer the 45 degree lines because they look less mechanical to the eye.) Keep repeating the hatching process, working from larger to smaller areas, from lighter to darker. As you work, the illustration will reveal itself, and you can decide how much value and detail to give to specific areas.

BREAKING LINES When inking long parallel lines, it's difficult to know just where to stop them. If they are running toward a different shape or edge, it's no problem. But when they must fade away, a different approach is necessary. First, I visually estimate in how large of an area I want to make the "fade." Second, I begin breaking the lines accordingly. Imagine fading a background from dark at top to light at the bottom. The first row of lines (in this case, horizontal), those farthest away from the fade, are solid. These are followed by several rows of long dashes with very small breaks. The next two or three rows contain slightly shorter dashes with slightly wider breaks. Keep repeating this process, shrinking the dashes and expanding the breaks until you reach the midpoint in your transition area, where the dashes and breaks should be roughly the same size. At the same time, layer the lines the way a mason lays brick: Every dash should have a break centered above and below it. As the lines descend, the breaks below each dash should become increasingly wider.

Midway down, the breaks take over and the dashes become increasingly smaller with each line until the last few lines will only be dots. At this point, I stop using a T-square and feather the last row with random, hand-placed dots. *Tip: To check work in progress, just cross your eyes slightly and examine the area you have just finished. White holes become immediately evident. If you wear glasses, removing them may have the same result.*

ROUNDED AREAS On a surface like the curve of an individual's face, curved lines that follow the contour of the object create the illusion of roundness. But take care not to be too literal. As you become more experienced, you will become more confident in abstracting these areas. Take, for example, the shaded upper lip of a woman or a child. If you don't abstract the lines, you may create a mustache. Instead of following the natural contours of the upper lip, bring your lines out across its surface in a curved, horizontal pattern. Hair would not naturally grow in this direction, so the eye more readily accepts this abstraction as shadow.

GETTING TO WORK

The projects which follow show these techniques in practice. The text describes my actual procedures, but you may learn as much simply by closely scrutinizing the art, dissecting it with your eyes.

Ken Dowd is a successful line illustrator who lives and works in St. Louis, Mo.

Illustration by Ken Dowd

Creating Form with Contour Lines My tools for this and all of the projects described in this article are simple: Letramax 4000 or 2000 boards, soft pencils for sketching and transferring art, a T-square and various triangles, a magnifier, a kneaded eraser and an electric eraser, black acrylic paint, sable brushes and various sizes of technical pens. In this and the following demonstrations, I have singled out complex or interesting areas to demonstrate some basic approaches.

1 For a cat food packaging project (see opener for finished art), I first transferred my reference photo image onto a Letramax 4000 board using an Artograph projector and a 2B pencil. I worked at repro size, approximately 8 x 9-inches.

2 I only rough in the drawing since I will change the animal's markings and other elements as I ink. Just pencil in your image with enough detail so that you have a guide for inking. *Tip: If you use too many pencil lines, they will smear when you are trying to clean up your ink lines later, using an electric eraser. Too much pencil on the board also adversely affects ink flow.* Using a Rapidograph 35, I established strong black areas first. This provides solid islands to draw toward when blending. Ink lines should flow with the grain of the cat's fur. Applying quick, short strokes of varying lengths keeps the art from getting too mechanical.

3 As I work, the black islands begin to be connected with tone. The areas around the nose and eyes have the most contour and so need special attention.

4 I want to create a middle value that doesn't swallow up the black markings, and preserve the clean, bright areas around the eyes. I do all the lines in one direction, allowing time for the ink to dry. Then Ichange my stroke angle slightly, crosshatching back into shadow to create the appropriate contours.

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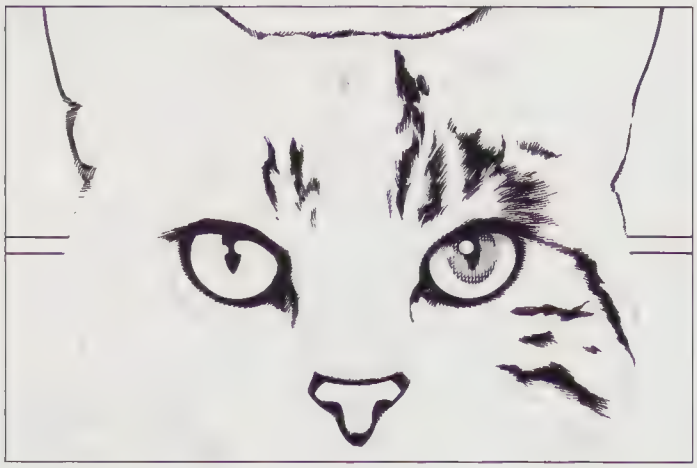

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Simple Line Portraits Many photo conversions require some amount of "plastic surgery," to be implemented at the artist's discretion. For this type of work, I generally work at 200 percent of repro size.

1 First, the sketch is transferred to the board. Then I inked the hair, the largest, darkest mass.

2 This done, I now know how much value to give the rest of the face. The eyes are done next, being the most important feature of the face.

3 After adding emphasis to other features as guides, I begin to add planes, light and shadows according to my reference. (You may want to make the nose slightly narrower than normal because line art doesn't give you much opportunity for shading.) Through the use of vertical shading, I try to make the mouth appear as though it cuts inward. Also, if I want the effect of lipstick, I outline the mouth with an unbroken line.

4 Next I added straight lines to the tip of the nose to make it look smaller and less straight. The lines radiating at the right edge of the face made it look too broad, so I add just a few crosshatched lines to slim it down and emphasize the dimple. Finally, a background shadow and clothing details are added.

Stippling Contrary to what you might think, the tops of the buns in this ad illustration (above) were the most difficult thing to render in this photo conversion. Stippling requires very specific dot placement.

1 First, the image is penciled onto the board. Then, because the buns are soft, the only solid line they need is their outline, which I inked first.

2 Next, I begin stippling, creating denser areas for shadow and fading out to white in highlight areas.

3 The hot dog is the darkest element, followed by the bun and the mustard. While you are stippling, it helps to cross your eyes slightly so that you see the area you are working on as a tonal value; then you can easily correct uneven values.

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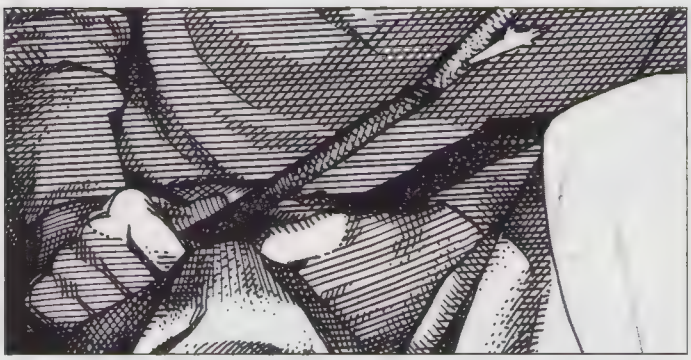

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Tight Crosshatching This scene is complex because of its involved series of bright light and dark shadow areas (above).

1 After establishing the black background with black acrylic paint and a brush, and the kids' outlines, the logs and the fire with ink and a pen, I begin crosshatching. I started with the girl on the right because the lighting on her shirt is stronger.

2 The other kids' shirts are handled as a unit. As I proceed to the other side, I found I was making a lot of mis-strokes because I was crossing so many planes.

3 Since I was erasing so much, I decided to use my electric eraser to add highlights.

4 Next, using a T-square and a 45 degree triangle, I add some secondary shadows. As I begin crosshatching the girl at left, I was pleased with the lighting effect.

5 But if all of the kids' pants were this light, the fire might look weak. To prevent this, I merged dark spots in the fire with the boy's pants. The crosshatching on the boy's pants is much tighter, with the knees (which are closest to the fire) reflecting the most light.

Crosshatch/Stipple Combination In this campfire-lit composition, I was faced with another shading problem. Because the lighting is so critical, I decided to combine crosshatching and stippling for the proper effect.

1 After completing the background and the girls' outlines, I moved on to the faces, beginning with the eyes and brows, then moving on to the black girl's forehead.

2 As I approached the portions of the faces which are reflecting the most light, I switched from crosshatching to simple stippling to fade out the shadows.

3 The black girl's skin is darker, so her face requires more stippling in the center and more crosshatching on the curved edges.

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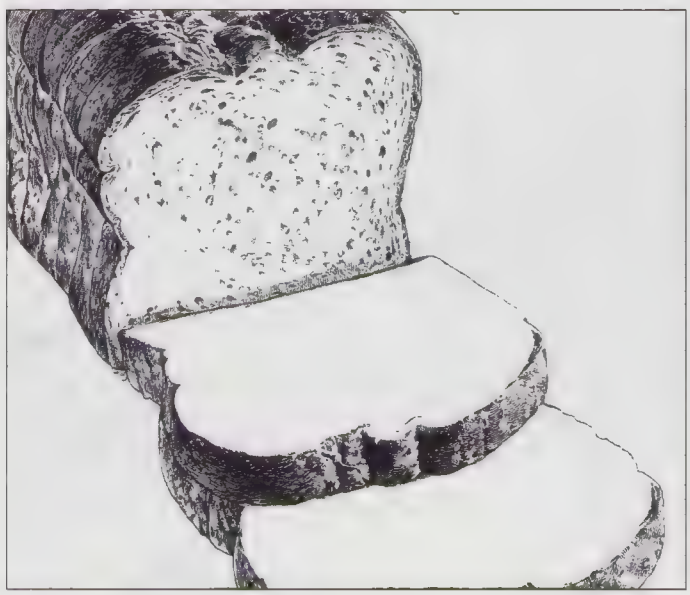

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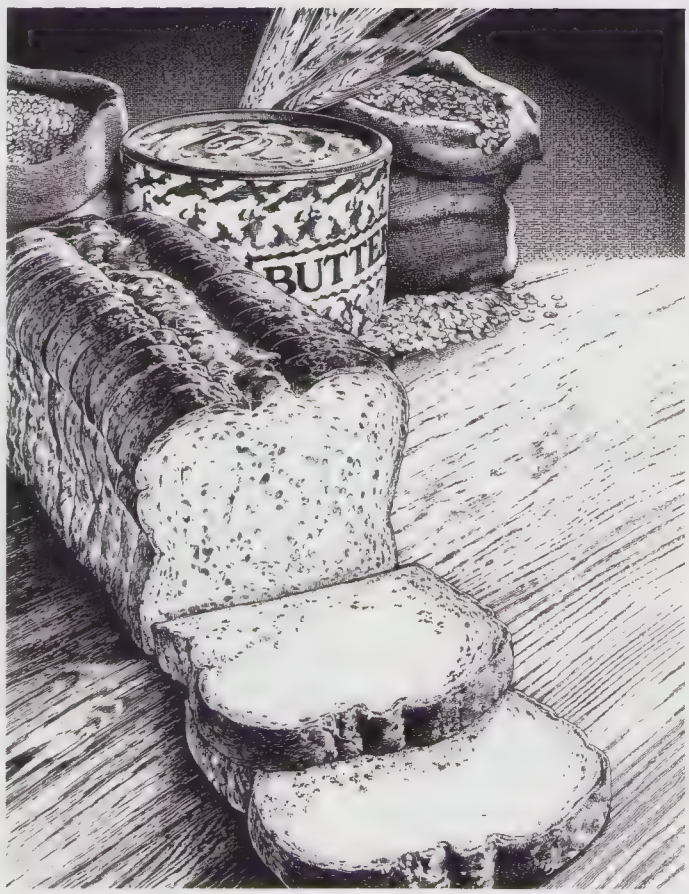


Creating Texture Rendering food art is really a process of editing out the unnecessary, concentrating on the crucial areas by adding texture. The illustration above began life as four separate reference photos: a loaf of bread, a butter crock, a bag of grain, and some spilled grain. I also referred to a wood-grained tabletop.

1 After transferring my sketch, I outline all of the elements in ink, and then complete the background using horizontal and vertical lines, completing a crosshatched arc on a black background. I continued working down the illustration until I reached the bread, which has a unique texture. Because the bread is what is being promoted in this ad illustration, its appearance is especially critical. For the crust, I used a combination of crosshatch and stipple.

2 For the face (cut edge) of the bread, I had to maintain the illusion of a fresh white that had some texture; the important thing was not to let it get gray. Following my reference, I improvise the bread's texture, using very short, light lines and dots.

3 When the loaf's face is completed, I simply draw its mirror image on the adjacent slice, but on a different plane. (To do this quickly, I photocopy my art, then turn the board upside down to draw this slice and the next.) The wood grain is also largely improvised, following my reference and working quickly. The grain on the right side is purposely kept lighter, since this is where the advertising copy will appear. ■

'Special Effects' Airbrushing: Surfaces and Textures Made Easy

Time-saving techniques for cutting friskets and creating underwater light effects, cloud art and feathers with the airbrush.

By Kurt Sinner with Michael Cacy

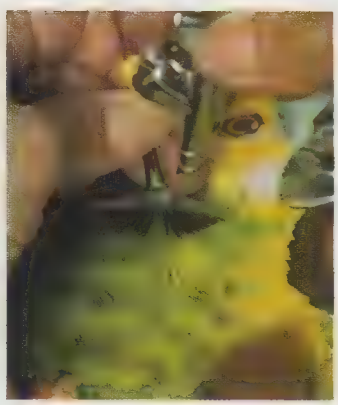
Time is money in illustration," says Portland, Ore.-based illustrator Michael Cacy. A long-time professional artist and teacher of hands-on airbrush and illustration workshops, Cacy is constantly on the lookout for faster ways of handling some of airbrushing's time-consuming methods.

Recently commissioned to do four separate pieces for three different clients with similar deadlines, Cacy reached into his bag of tricks again for a little help. What follows are the steps he took to save time cutting friskets and to achieve complicated textures, effects and surfaces in a matter of minutes, not hours.

FEATHERS AND FUR

Different types of brush bristles yield unique effects which are excellent for rendering the appearance of fur or feathers. Experimenting with natural and synthetic bristles will help you determine which will produce the most convincing results for a particular look.

For example, to establish the feather pattern and detail on a parrot (above), Cacy sprayed through the splayed bristles of No. 1 and No. 3 Liquitex Kolinsky Plus fan brushes (see the photo at right). "For the feathers I pushed the bristles down flat against the artwork in order to widely spread them. Then I sprayed a little pigment, in this case Com-Art opaque and transparent media, into the bristles." *Tip: Anyone new to the technique should practice with India ink first.* "As with any loose mask, I avoid airbrushing too wet or I'll wind up with undesirable results. I'm also careful not to track paint around the artwork. Using a double-action airbrush helps, too, because I am able to paint, dry the bristles with air and paint again before repositioning the fan brush. I frequently cleaned and dried the bristles before continuing the painting process. This fast and intriguing method of creating a specialty pattern allowed me to paint the feathers on the parrot in just minutes."



Feathers & Fur Cacy avoids spraying too wet through the brush bristles. The double-action airbrush air-dries bristles and paint so he can apply more paint or move the brush to another area.

Killing Two Birds With One Stone To "punch up" the color of the sea fan underwater, the artist experimented until he came up with an interesting mixture of equal parts watercolor dye and masking fluid. Once the painted area was dry, the mask over the sea fan could be removed by rubbing it with a clean finger or with drafting tape. (See steps 1 through 4 at right.)

MIXING WATERCOLOR DYE WITH LIQUID FRISKET

On a recent assignment in which Cacy illustrated an underwater scene (shown above), he agonized over the best way to render a coral sea fan. Since this element of the underwater landscape was delicate, intricate and colorful, it could lend some intriguing pattern and detail to the composition. But he wondered how to keep the style and technique consistent with the "airbrush look" his client expected. The obvious solution, rendering the background and then tediously handpainting the sea fan later with gouache on a tiny brush, seemed too inconsistent with the transparent techniques which would be used throughout the remainder of the illustration. "It could easily ruin the spontaneity and freshness I envisioned by looking 'suffered over,'" says Cacy.

After some experimentation, Cacy found that by mixing watercolor dye (either Dr. Martin's or Luma) with liquid frisket (Winsor & Newton Art Masking Fluid), the brilliant color of the sea fan could be maintained, while at the same time protecting that area from the overspray of the surrounding water background. (Refer to the photos at right.) "I found that just the right mix of dye to liquid frisket is required, but the result was exactly what I was after," notes the artist.

Tip: Do not allow masking fluid to dry in the bristles of your brush. Clean bristles thoroughly with soapy water while the fluid is still wet.

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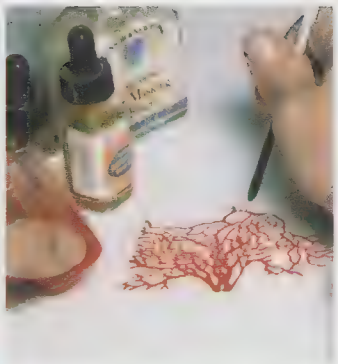

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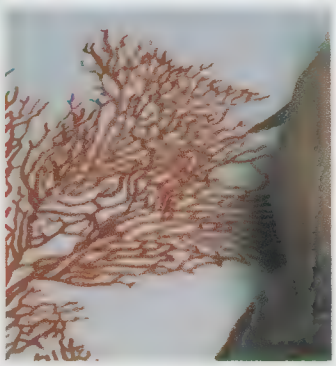

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1 Cacy mixed equal parts of Dr. Martin's concentrated watercolor dye (the red-orange was created with scarlet and a drop of sunshine yellow) with Winsor & Newton Art Masking Fluid.

2 With an inking nib and a synthetic bristle brush, this solution is applied in the configuration of the sea fan to the unpainted surface of Strathmore medium surface two-ply paper, which will be the ground for this painting.

3 Once dry, the surrounding area may be sprayed with the airbrush. "My only consideration in laying in the water background was building up value and color [Com-Art transparent media] that would 'punch out' the colorful sea fan," notes Cacy.

4 Once the freshly painted area is entirely dry, the rubbery mask over the sea fan may be removed by rubbing with a clean finger or with drafting tape. (If the masking fluid is difficult to remove, you have added too much dye into the mix.) Since the cold press surface of the Strathmore is absorbent, the dye color remains after the mask has been removed. As a finishing touch, portions of this sea fan were oversprayed with the same transparent colors used earlier in the water area so as to suggest depth, lighting, color shift and to "family" the fan with its surroundings.

UNDERWATER LIGHTS

Beginning with a pencil tissue sketch, the artist transferred the sketch to frisket, using the same method he employs for the fish illustration (see "A Crazed-Edge Look" on the next spread), and applied the frisket to the hot press illustration board. (Refer to the demonstration photos on the opposite page.)

DUAL-CUTTING FRISKETS Faced with cutting equidistant pairs of lines on the pool deck to appear as grout between tile, Cacy used a double-bladed knife, the Grifhold Duaflex Dual Cutter, and a simple rolling ruler to make the cuts. "The knife is adjustable, just like a compass, so I can set whatever distance between the blades I want. It takes a little practice, but in this case a single swipe of the knife gives me two perfect cuts in half the time," says Cacy.

To get the effect he wanted in the pool, Cacy painted the shark first, then attacked the shadow areas. Next he sprayed a transparent aqua tone over the entire pool area, shark, shadows and all, having masked off the deck previously.

REFRACTED LIGHT IN WATER To render the refracted light in the pool, Cacy turned to his stencil burner. First, the artist penciled a webbed pattern on .004 drafting film (Herculene brand) as a guide for his cuts. "For reference, I gathered various underwater photos showing refracted light, but the web scheme was really just an invented pattern." When cutting acetate or mylar with a stencil burner, he always cuts on glass when he needs a smooth cut. The hot, needle-point tip glides across the glass for clean cuts. "But in this particular case, I lifted the mylar off the glass and burned a channel through it. I varied the width of the channel simply by pushing the tapered tip of the stencil burner further through the drafting film," says Cacy.

Refracted Light on an Underwater Surface This illustration was created in part by spraying through a loose mask cut with a stencil burner and placed over the surface of the shark and the water. The artist combined the mask with more traditional techniques to accomplish the overall effect of light refraction. He also used a dual cutter and a rolling ruler to create the parallel cuts on the tiled deck quickly. (See steps opposite.)

To begin the special effect, he remasked everything in the pool but the shark by repositioning frisket shapes which had been previously removed. Positioning the mylar mask next, Cacy sprayed white gouache through the channels created with the stencil burner. He was careful to vary the amount of paint he sprayed through the channels, hitting some areas more than others. Cacy occasionally lifted the mask off the surface to check the pattern. He also deliberately repositioned the mylar mask off-register once, in order to paint a less heavy, sub-dominant pattern. Once the artist had rendered a pattern of light across the back of the shark, he freehand-sprayed a white dot at the intersections of the white lines to connect them using a custom micron airbrush (a new tool featuring a micron tip). "It's been my observation that these intersections are the hottest points of light in underwater refraction," says Cacy.

With the effect established on the shark, Cacy masked it off, revealed the water in the pool and repeated the same procedure over the pool. All that remained was the deck and lounging figure. Covering the water, he went to work on that section using conventional techniques primarily with Com-Art transparent media and working from dark to light.

After completing the piece, Cacy was dissatisfied with the area next to the lounge chair and the position of the cast shadow. So he decided to patch a new section on top of it. On CS-10 paper, he rendered an inflatable tube, a towel and another shadow at a slightly different angle. "It's a relatively easy patch. CS-10 paper is quite thin and lends itself nicely to this type of revision. After painting the additional props and shadow, I trimmed it with a knife, sprayed 3M Spray Mount onto it, and stuck it right onto the board over the original rendering," says Cacy.

Since the art was rendered on a rigid piece of illustration board and color separated for reproduction from a 4 x 5-inch color transparency, the surface of the board was not stripped away from the card for laser scanning. If it had been, however, the patched revision could have been achieved with another method commonly used by illustrators when altering finished art, one which also features a paper patch.

The patch is positioned in register over the illustration board original, and then is carefully trimmed with a knife blade or scalpel. This cut needs to be deep enough to slice through the top surface of the illustration board. Once the contour of the patch is cut, the paper is removed and the top surface of the illustration board within the area to be revised is peeled off the board. Adhesive is applied to the back of the paper patch. The patch is then "laminated" right into the surface of the board, thus eliminating the possibility of shadowing along the edges of the patch in reproduction. The artist says he usually applies spray mount adhesive for these kinds of "laminated" patches.

1 To save time, the artist avoids retracing the tissue drawing down to the illustration board by placing the tacky side of matte Friskfilm directly onto the graphite drawing. After burnishing gently with the heel of his hand and a flat-sided burnishing tool, he separates the frisket film from the tracing paper and adheres the film to the illustration board. The drawing now exists on the underside of the film.

2 Using a Grifhold Duaflex Dual cutter, which he holds along a rolling ruler, Cacy can make two parallel cuts in half the time.

3 Spraying Com-Art transparent color over the entire pool area after rendering the shark and cast shadows, Cacy prepares this portion of the illustration for the light effects.

4 The artist pencils a web pattern onto .005 Herculene drafting film as a guide for his stencil burner cuts. Designed to cut .005 or .010 mil acetate, the stencil burner also cuts frosted mylar easily.

5 For some of the cuts Cacy leaves the mylar flat against a glass surface. This traditional method produces a smooth, fluid cut.

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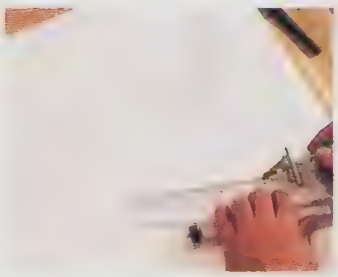

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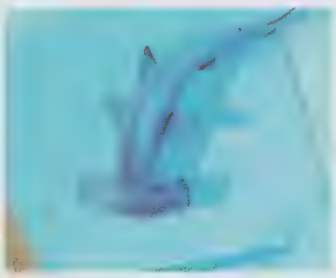

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6 For less regular cuts, Cacy lifts the mylar off the glass to burn channels of varying widths. Much like making a stencil letter, he takes care not to cut the area where two lines intersect to prevent the shapes from falling out.

7 Placing the cut mylar over the shark after masking off the surrounding water, Cacy sprays white gouache through the channels. He has also placed loose acetate masks over vertical shapes, such as the fins, to avoid spraying light effects where light would not fall or where the pattern of light would appear differently than the broad, top plane of the shark.

8 Cacy occasionally lifts the mask off the surface to check the spray pattern. If a highlight is too subtle, he can drop the mask again and slowly spray more white into the channel.

9 Once the webbed pattern is complete, Cacy removes the mask and sprays connecting dots where two lines intersect to create refracting highlights.

10 This detail of the original piece shows the area near the lounge chair before revisions. The new patch, rendered on CS-10 paper, trimmed with a knife and adhered to the board with spray mount, includes a towel, inflatable tube and a realigned cast shadow.

A 'CRAZED-EDGE' LOOK

When he was faced with a tight deadline, hundreds of unevenly notched frisket cuts and too little time, Cacy opted to use a stencil burner to make the numerous cuts necessary to get the jagged edge in the border surrounding the fish (at right). "Normally I wouldn't cut frisket with a stencil burner as it is not designed to do that. But in this rare case, where repositioning the frisket isn't a priority and the possibility of slightly scarring the board isn't a problem, the stencil burner will cut frisket for a crazed-edge-look better than a knife." *Tip: An electric stencil burner has a needle-sharp point that heats up and can cut .005 mil acetate as fast as you can draw. It is frequently used for loose masks and is especially useful for irregular shapes that are difficult to cut with a knife.*

To begin the project, Cacy started out with an approved marker comp, a pencil tissue sketch and inked line art on .004 frosted mylar (Herculene) that would eventually be converted to a Chromatec transfer (a custom, dry transfer specified in his Pantone color of choice) after the piece was painted. (Refer to the demonstration photos opposite.) *Tip: A Chromatec dry transfer is created with a daylight, negative-based system that uses a UV light source. It takes roughly five minutes to produce a 9 x 12 transfer.*

Next, Cacy burnished the frisket (Friskfilm) over the pencil tissue sketch so that the graphite drawing would adhere to the sticky side of the frisket. *Tip: Available in low and high tack, matte or gloss, prepared frisket film is one of several different kinds of masking materials; others include tape, loose paper, acetate and liquid frisket, which is used for small detail work. (Any adhesive masking should not remain on the art any longer than necessary.)* He then positioned the frisket on hot press illustration board (Frisk CS-10) and cut the outside contour of the fish with a knife. *Tip: Hot press or "plate finish" illustration board has a smooth finish; cold press surfaces have tooth.*

Ready to go to work with the stencil burner, Cacy typically takes a few practice turns on another frisketed board to make sure the board will not scorch. "You will not burn the illustration surface as long as you keep the stencil burner moving, and that's the whole idea—you're trying to do the piece quickly. The stencil burner does create a needle-sharp channel, however, so it's not going to work on pieces where exact edge-to-edge replacement of the frisket shapes is necessary."

Working on the border closest to the fish, Cacy made his first stencil burner cuts. Next, he positioned and taped (in non-critical areas) a slipsheet over the fish to protect the lines on that portion of the frisket from overspray. Using painting tape (Easy Mask), he protected the perimeter of the piece as well.

Cutting Frisket With a Stencil Burner One in a series of several pieces commissioned by Tucker's Tees of Bermuda Limited, a sportswear company, this fish is characteristic of the kind of airbrush art that combines traditional frisket cutting with a knife and a rarer, but effective use of a stencil burner to cut frisket directly on the painting surface. (See steps opposite.)

To render the background field next to the fish, the artist removed the frisket in that area and sprayed Com-Art transparent violet with a double-action, internal mix, gravity-feed airbrush. *Tip: This variety of airbrush is preferred by many illustrators for general purpose airbrushing (especially for use with water-based and acrylic type media).*

To render the random spatters, he stippled opaque phthalo green over violet. The airbrush will stipple well when the needle cap and nozzle cap are removed and the air pressure is lowered at the regulator. In this case, however, the artist achieved a very erratic stipple by choking off air pressure while crimping the air hose.

After replacing the frisket to cover the violet background, Cacy moved on to the red, orange and yellow areas of the border, in that order. "The reason this piece lends itself so well to the stencil burner is that I can use what I call the 'cut-n-blow as you go' method of airbrushing. In other words, I can make my cuts, pull up the frisket, spray, pull up more frisket, spray, and so on, without worrying about covering the previously sprayed area." Color selection and spraying sequence also influence the choice to use the stencil burner. Spraying one color over another, in this case, does not significantly alter the previous color. *Tip: The phrase "cut-n-blow as you go," coined by the artist, contrasts with "area-by-area" airbrushing, in which certain areas are revealed, painted, then re-masked in preparation for work on the next area. With "cut-n-blow," you do not re-mask after revealing the masked area the first time. Aside from simple freehanding, these methods characterize the two most common conventional airbrushing techniques where frisket film is involved in the painting process.*

Finishing the warm colors in the outside border, Cacy repositioned the frisket shapes and sealed the cuts with Scotch removable tape. To get the jagged look on the inside edge of the two blue borders, Cacy used a knife. "I made the next cuts with a knife because I was worried about scorching the paint underneath. I tried to mimic the effect that I got with the stencil burner because I really like that crazed edge. I also like the idea that people will wonder how that was done."

With the border concealed, Cacy painted the fish using conventional airbrushing. Colors included Com-Art opaque and transparent and Schmincke Aerocolor.

One of the final steps for this project was to apply the rhodamine Chromatec transfer, rubbing it down with a burnishing tool over the cut line on the contour of the fish. Cacy also dipped the handle of a paintbrush into the same phthalo green acrylic he used for spattering earlier and placed larger dots of color on the background for additional variety.

1 Keeping the stencil burner moving is important to avoid scorching the illustration surface. The needle-sharp channel created with the burner makes it unsuitable for pieces that require exact frisket repositioning. But this crazed-edge border is achieved more easily with the stencil burner than with the knife.

2 To achieve the spatter effect, Cacy removes the needle and nozzle cap from the double-action internal mix airbrush, then reduces and varies the air pressure simply by crimping the airhose, then stipples Com-Art phthalo green opaque over the violet.

3 Cacy sprays the red areas first. Leaving those exposed, he moves on to the orange. Leaving both the red and orange revealed, he oversprays the entire area with Com-Art transparent cadmium yellow.

4 Using a knife to cut the outside edges for the two blue borders, Cacy sprays ultramarine gouache outside and a tinted opaque turquoise closest to the fish.

5 Cacy relies on a Chromatec transfer to establish the outline of the fish. He applies the red line transfer directly onto the surface of the art with a burnishing tool.

6 The artist puts on the finishing touches by dipping the handle of a paintbrush in a capful of undiluted opaque phthalo green paint and applying larger dots to the already stippled background.

RENDERING CLOUDS

"With airbrush art, there is a danger in making things look, well, too 'airbrushy.' By using various tools and combining your techniques, any one technique is disguised by the others," says Cacy. The tools and techniques he employed to paint a cloud illustration (shown at right) demonstrate that unique blend of methods.

To begin, Cacy took his pencil tissue sketch, placed it under a piece of clear sheet glass and cut the initial cloud shapes from .005 mil acetate with the stencil burner. For cloud shapes he would cut and spray later, he used a Staedtler (Lumocolor 313 S) permanent black pen. When Cacy was ready, he put the acetate back on the glass and cut those shapes out. (Refer to the photos on the opposite page)

For this painting, the artist chose Strathmore medium surface, two-ply bristol. "It has a bit of a tooth to it. I prefer the back or vellum side because it has slightly less tooth and is generally the favored side for airbrushing." On this paper surface Cacy scattered titanium sponge, a metal gravel he gets from a friend at an industrial plant. *Tip: All sorts of things—beans, macaroni, rock gravel—will work for this kind of an effect.* "I prefer the titanium sponge because it is heavy and will not blow around when I spray with the airbrush," says Cacy. His initial color palette consisted of Com-Art transparent ultramarine, violet, black and rose, all sprayed over the metal gravel. The loose acetate mask was also in place to establish the contours of the clouds.

Says the artist, "I vary the color just to make it interesting and I later disguise the effect of the titanium sponge by freehanding more than one color over the painted area after the gravel has been removed. The metal gravel gives me the basic underlying logic of the boiling effect of these clouds. I don't mind at all that much of the effect is lost when the other color is sprayed over the top of it when I airbrush freehand and use a variety of loose masks and the polyester batting." *Tip: Polyester batting can be obtained at any fabric store. Just ask for polyester fiberfill.* When he cleared away the titanium sponge, the initial effect was complete. He repeated the process on the lower portion of the art and then sprayed across the contours of, as well as through, the polyester batting.

When using these techniques, keeping a fairly dry spray pattern is important, cautions Cacy. *Tip: With loose masks, among a host of other problems, spraying too wet can cause the paint to bead up along the edge of the mask. Also, fogging the color on (applying the paint in a deliberately "dry" spray pattern) allows the artist to "scrub in" highlights with a traditional pencil eraser or an electric eraser.*

During this process, the artist surrounds himself with cloud reference as a constant visual reminder of cloud textures. To better capture the softness of some of the clouds, Cacy frequently lifted the edge of the acetate mask while spraying to give the edges a softer look. "Where I want harder edges, I just let the acetate lie flat against the surface. Where I want windblown effects in the clouds, I stretch the polybatting with the fingers of one hand while spraying with the other."

For some of the lighter areas in the clouds, the artist rubbed chalky pastel (FaberCastell Nu-Pastel) well into the surface of the paper with his fingertip. The opaque pastel is capable of soft edges, and blends well with the other media on the Strathmore surface. Once the clouds were complete, Cacy sprayed the sky background area freehand, using transparent media.

Cut from acetate, the lightning bolt mask was placed on top of the cloud formations and sprayed with Winsor & Newton permanent white gouache. To finish the piece, Cacy perfected the points of the lightning bolts with white pencil.

"This whole process of creating clouds is a combination of techniques and media that allows the piece to evolve as it is worked. One technique is disguised by another, so the finished piece has a certain amount of mystery to it. You know it's successful when another illustrator looks at it and says, 'How in the world was this done?'"

Mysterious Mixed Techniques for Cloud Art Commissioned by freelance art director Rick Grant for use on business cards, letterhead and corporate literature for client Brainstorm Imagineering, this cloud piece combines several techniques, each one disguising the next. Using loose acetate masks, a stencil burner, titanium sponge (a metallic gravel) and polyester batting, Cacy captures the thunderous power of the clouds more quickly with these useful aids. (See steps opposite.)

Kurt Sinner is an Oregon-based freelance writer specializing in airbrush art.

1 Placing a pencil tissue sketch under a sheet of clear glass, Cacy cuts cloud shapes from .005 mil acetate with the stencil burner. "The small fan blows whatever fumes are created away from me as I make the cuts," says Cacy.

2 Cacy outlines with a Staedtler permanent ink pen the shapes of clouds he will cut later. Having those clouds drawn on the acetate allows him to refer to their relationship to the cloud shapes he will render first.

3 The use of the loose acetate mask, in combination with the titanium sponge (a metal gravel), is disguised when Cacy freehands other color combinations into those areas.

4 Clearing away the metal gravel, Cacy prepares to spray across and through the polyester batting to achieve different effects, further disguising the results in previously painted areas.

5 Using the same combinations of transparent colors sprayed over the titanium sponge, Cacy fogs paint around and through polyester batting.

6 Using a pencil eraser or an electric eraser, Cacy rubs off paint to lighten certain cloud areas. "This technique works even better on a flat plate surface like Frisk CS-10," says Cacy.

7 Cacy creates soft contours in the clouds by lifting the acetate away from the surface while spraying. When he wants to render a hard edge, he leaves the mask flat against the art surface.

8 The artist begins to put finishing touches on the clouds. Here he rubs cream-colored NuPastel into the Strathmore surface. The opaque pastel is capable of soft edges, and it blends well with the other media in the illustration.

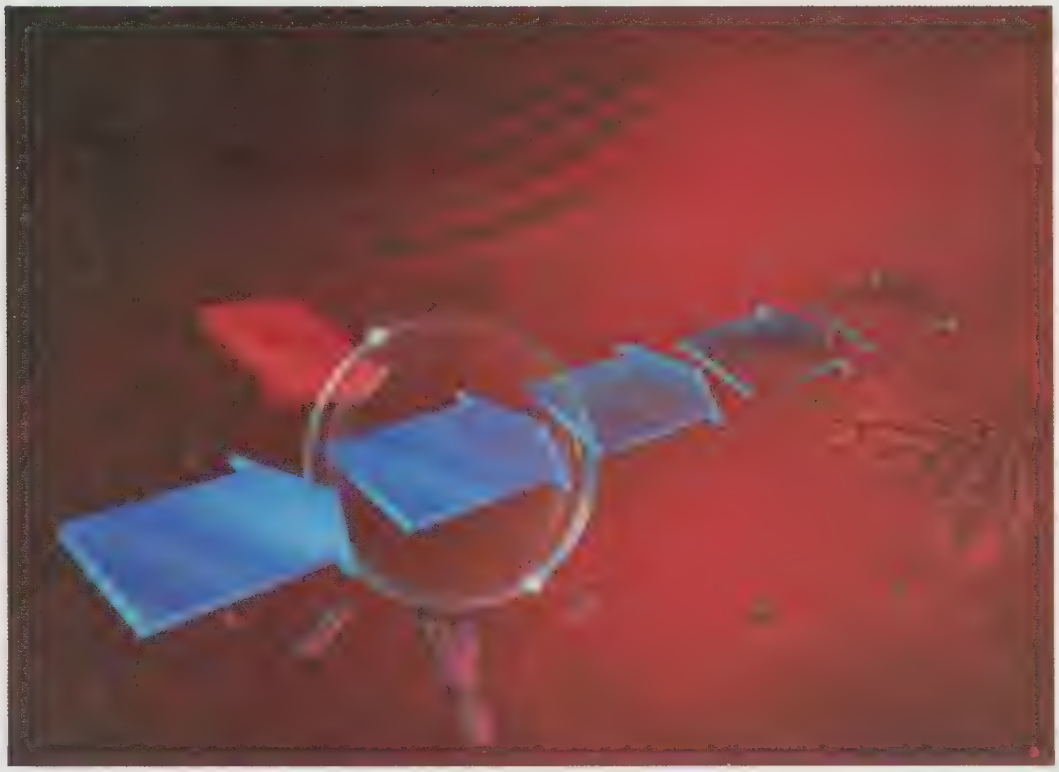
9 Using Com-Art transparent colors, Cacy freehands the sky background. The transparent media can be fogged on lightly, building up the density of color gradually and blending it smoothly into the cloud elements.

10 The lightning bolt is cut from .005 mil acetate, placed directly onto the surface of the illustration and sprayed with Winsor & Newton permanent white gouache.

Michael Cacy is an award-winning Portland, Oregon-based illustrator. He has lectured on airbrush techniques worldwide and teaches workshops for Dynamic Graphics Educational Foundation (DGEF). ■

STEP-BY-STEP

Practical Lessons in Perspective



Once you realize there are lots of imaginative ways to incorporate perspective in your work, you don't have to be afraid of it.

By Daniel S. Cutler

How can you multiply 4½ by 6⅝?" sputters Lucy, in an imaginative "Peanuts" cartoon. "That's ridiculous! Why should I learn that? I'll bet in my life I'll never multiply 4½ by 6⅝!"

"How can you be sure?" asks her friend Charlie Brown.

"I'll refuse to do it!"

Many art students sputter—indignant as Lucy—when introduced to the laws of perspective. Once they have grasped the idea that railroad tracks appear to converge on the horizon, their eyes glaze over. "In my whole life I'll never do this," they complain. "I'm going to just paint what I see. And if I can't figure it out I'll take a Polaroid. Besides, I don't do buildings!"

What could be more antithetical to architectural rendering than the depiction of organic forms and biological subjects common in medical illustration? Keith Kasnot, one of the foremost artistic interpreters of medicine, regularly calls upon his thorough understanding of perspective to create images no Polaroid could ever snap.

What follows is not an exhaustive treatise on perspective; that would be far beyond the scope of this article. Rather, Kasnot discusses five projects in which his mastery of perspective allowed him to create some unique imagary. Each of the projects contains insights and techniques—we could call them "lessons"— every realistic illustrator will want to know.

Perspective Grids Reusable, preprinted perspective grids have long been used by architects and industrial designers. Kasnot finds such aids tremendous time-savers in developing convincing pictorial space, such as this diagrammatic representation of a complicated biochemical phenomenon (above).

PERSPECTIVE GRIDS

How do you develop a solid object in perspective when there is no reference whatsoever?

This is a problem long faced by architects and industrial designers who have to render specific dimensions of objects and buildings from revealing angles. Their simplified system of using preprinted perspective grids proved invaluable to Kasnot in a visualization of how a cholesterol-lowering drug works.

"This project was really exciting because it came to me more highly art directed than what I usually get," Kasnot recalls. David Winigrad of the Hal Lewis Group in Philadelphia conceived of a way to show that the drug Zocor blocks one stage in a cascade of events in the synthesis of LDL-cholesterol ("bad" cholesterol).

Winigrad saw the events as a series of arrows; Zocor was to be portrayed as an impenetrable barrier shielding one critical "event" from being acted upon by surrounding arrows. "It was the best description I had seen explaining this difficult physiology," Kasnot notes.

Although the concept was worked out, Kasnot was left to refine it. His perspective problem was to make sure the arrows appeared equal in length, and that they were equally spaced as they traveled deep into the picture. Preprinted perspective grids provided a ready solution ❶. The grids, published in a package of eight, look like a tiled floor in perspective (other companies also publish cubical solids and room interiors "tiled" in varying perspectives). Composing a drawing on the grids allows the artist to measure by simply counting tiles (which may be thought of as inches, feet or any other unit).

Kasnot selected a grid in which the tile edges run off at a 45 degree angle. To the grid, he taped a sheet of tracing paper. The artist then counted three units for the length of each arrow, leaving a half-square space between them ❷. He penciled the sketch and sent a photocopy to the art director.

In the printed brochure, text would be dropped into these arrows. Using Aldus Freehand on a Mac II, the text was skewed to match the 45 degree angle of the arrows. But a typefitting check revealed a problem: As the arrows receded, they grew too short and stubby to accommodate the text. When told of the problem, Kasnot experimented and recomposed the arrows using a different grid ❸.

PAINTING Although the art director had described a stylized rendition of the concept, Kasnot decided to embellish the image by placing the arrows within an organic-looking space. On a Strathmore 500 series high-surface board, he sprayed purple Schmincke gouache with his Paasche H airbrush. He then covered the area with red using the same tool. (The artist finds that the Schmincke pigments are milled very fine and run without clogging the Olympos M-P 200B airbrush he favors when he is working on detailed areas.)

Over the warm ground he sprayed cool Com-Art transparent colors for "a nice, biological look." He spray fixed certain areas of the background, then went back in with either water or Com-Art cleaner on a natural sponge to lift off color and develop it further. He rendered the arrows and bits floating about with Com-Art Opaque colors, which he likes because they are very brilliant.

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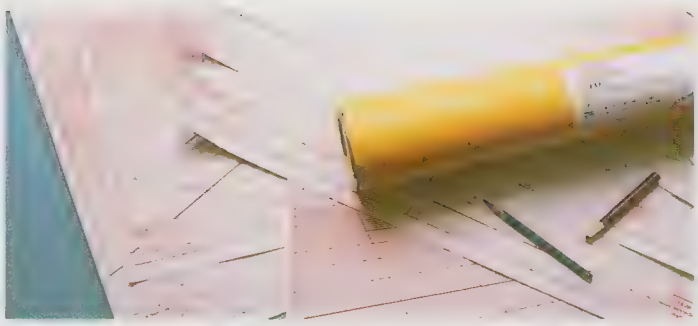

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1 Kasnot works with a set of eight Lawson perspective grids published by the Van Nostrand Reinhold Company of New York. Each chart may be flipped to provide an additional eight views.

2 Kasnot's perspective challenge is to ensure that, though the arrows recede in space and diminish in size, they appear to be the same length and are equally spaced. On the Lawson chart the artist has merely to count off an equal number of units to establish the arrows' lengths.

3 He discovered the best fit by using a 30/60 perspective grid, where the lines are most diverged from the vanishing point. Penciling the arrows at the very bottom of the grid instead of on the center of the page provided ample area in which to drop the text. More of the top surface of the arrows can be seen.

Photos by Kevin Cruff

Ellipse Guides In this dramatic view portraying a pharmaceutical product in action, meteor-like cholesterol molecules are attracted to binding sites, which Kasnot shows as craters on the globe of a single liver cell. The ellipses are all drawn in perspective with the aid of ellipse guides.

LEARNING TO WORK WITH ELLIPSE GUIDES

The outline of a sphere never changes from any angle, but tilt a flat circle and what do you see? An ellipse. Anyone who has ever sketched a "Still Life With Bottle" knows how an illogical ellipse can undermine the most carefully shaded composition.

In the engineering section of their local art store, illustration students often discover green plastic ellipse templates. Some buy them, but few take the time to understand how to use them properly. Kasnot is one artist who has learned how effective they can be in his everyday work. Most recently, he used them in a companion piece to the illustration just described.

Kasnot's job was to paint how a drug (Zocor) helps eliminate cholesterol through the liver. In the new illustration, meteor-like cholesterol molecules crash into circular craters on the surface of a liver cell. Using ellipse templates, Kasnot drew the craters so they appear to follow the curving surface of the cell.

Working on highly transparent Seth Cole 16 lb. tracing paper (which he feels does not smudge as much as other papers), Kasnot first drew a 10-inch circle to represent the outline of a globe-like liver cell and then drew two lines crossing at the center point ❶. Aided by 10-inch ellipse templates (Alvin), he belted the globe with longitude and latitude lines ❷. *Tip: When seen straight on, a circle appears as a flat line; a slight tilt yields a narrow ellipse which widens as the circle approaches a face-on view. Ellipse templates are marked by how many degrees the circle has been tilted from the straight-on view. A 20 degree circle is narrow. A 60 degree circle approaches round.*

To get the quadrant of the globe that he wants to use for the background, Kasnot enlarged the globe to working size on his studio copier, a Minolta EP410Z Graphic Artists' model. *Tip: The copier can enlarge and reduce from 200 percent to 50 percent in 1/10-inch increments. Equipped with an anamorphic lens, it can also alter the proportions of an original by enlarging in just one dimension, a feature Kasnot uses frequently to tweak the proportions of a sketch without significantly changing its perspective.*

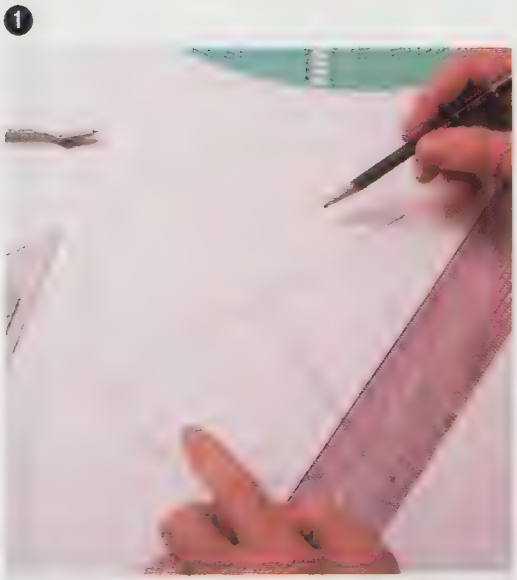
The enlargement was so big that Kasnot had to "tile" several sheets together. This enlarged version was needed because he had to keep track of the vanishing point, which would be behind the center of the globe.

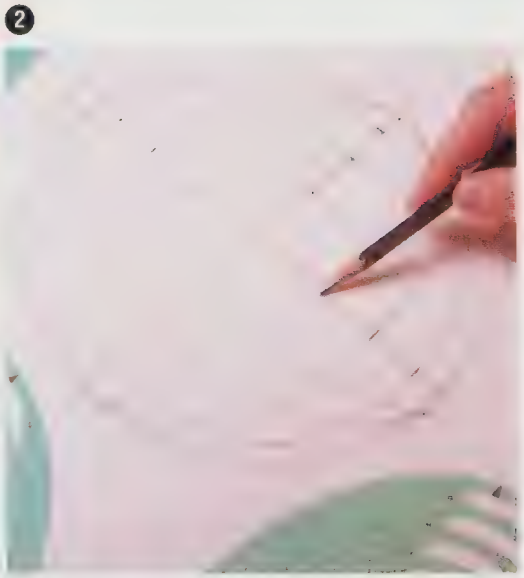
As the first step in establishing the circular craters so they would follow the curved surface away from the picture plane, Kasnot drew a line from the vanishing point through each of the intersections on the globe ❸.

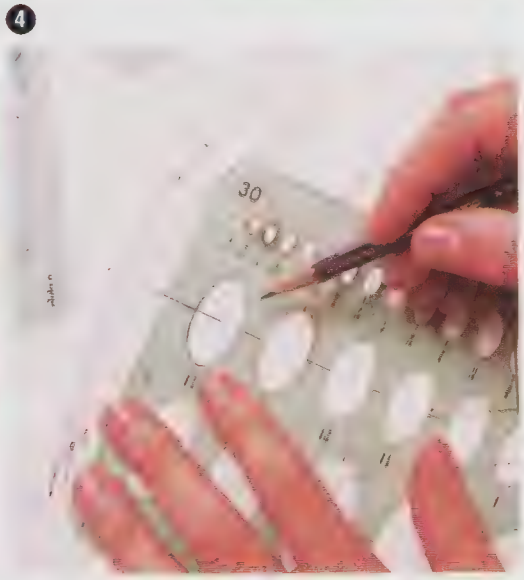
Each line represents the axis of an ellipse, an imaginary wire threading through the very center of that tilted circle. Tick marks on the ellipse template represent that axis; they are the ones on either side of the short dimension of the ellipse ❹.

Tip: "Axis" means axle in Latin; the ellipse represents a circular wheel at the end of an axle. Always try to determine which way the axle of the wheel is pointing. Here, the craters may be thought of as wheels on axles radiating from the center of the globe. Each axle points toward the globe's center, the vanishing point.

As the craters recede toward the edges of the globe, Kasnot draws the ellipses smaller, but always maintains their proper orientation. So that the circular meteors (cholesterol molecules) are aiming directly into the craters, Kasnot centers the circles that are their foundations over the same axes ❺.







1 Using a compass, Kasnot drew a 10-inch globe, then added two lines within it, at right angles to one another. Both lines pass through the center point (easily detected by the pin prick in the tracing paper left by the compass point). This center point will be the vanishing point.

2 To draw the longitude and latitude lines, Kasnot places the 10-inch Alvin ellipse guides on the globe in the degree he needs (20, 40 and 60 degrees) and traces the ellipse. Although he only plans to show a portion of the globe, he draws all the lines so the perspective will be accurate.

3 On his photocopier, Kasnot enlarges the sketch and chooses the portion he will use in the composition. At each of the intersections shown here, he plans to draw a crater. The vertical lines shown here are drawn from the vanishing point (marked VP) and will be the center of the elliptical craters and the circular meteors. The ellipses follow the curvature of the globe away from the picture plane.

4 Once the center point is established, Kasnot properly orients each template by lining up the tick marks on either side of the short axis in register with the line radiating from the vanishing point. He then traces the ellipse.

5 Once the ellipses are all in place, Kasnot draws the cholesterol molecules that must crash directly into their receptor sites using a circle template. He makes sure that the circles (cholesterol) are centered on the ellipses' axes.

Tilting an Object in Space To dramatize the presentation of prostate anatomy for a cover of *Contemporary Urology*, Kasnot chose to slice the gland and show it from an exciting angle (at right). The viewer is up close to the specimen, peering between separated sections which are receding in space.

1 For reference the illustrator had only ultrasound images and diagrams portraying the anatomy sections from a face-on view. To accurately recompose these complex images in perspective, Kasnot first prepared a linear sketch for each section upon a grid of squares.

2 Kasnot drew the same grid in one-point perspective—all the lines converge to one point—then plots critical points from the first grid in the same spot on the perspective grid and connects the lines. He also adds lines in the front of the drawing to indicate dimension.

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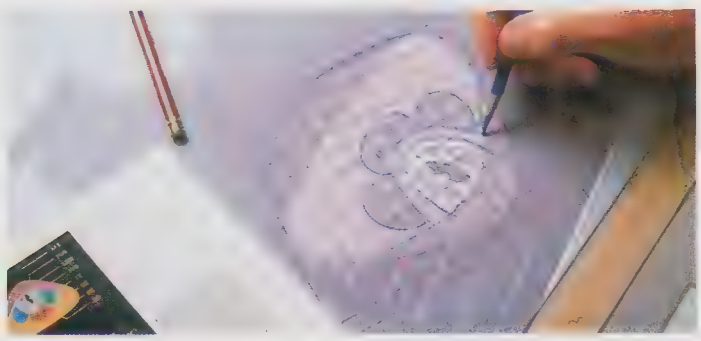

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TILTING IN SPACE

Suppose you are called upon to illustrate a room interior. A well-known painting hangs on the wall. How can you reconstruct such a complex image as, say, an Escher print, tilting away in space when all you have is a straight-on copy of the picture?

Kasnot was faced with a similar problem in creating a dramatic presentation of prostate anatomy for the cover of *Contemporary Urology*. For reference he had ultrasound scans and diagrams of the subject. But, of course, none of the reference portrayed the sections pitched at an angle to the picture plane, the view he wanted to portray.

Kasnot handily solved the problem by first diagramming each section to be shown onto a grid of squares ❶. He then drew a similar grid in one-point perspective, plotted critical points and reconstructed the contour of the subject, now tilting away at the desired angle ❷.

Once the linear sketch is completed, Kasnot works out all tonal problems in a detailed study, work that often adds as much as 12 hours to a project's completion. "I love to paint too much," he explains, "to be worrying about anything but color and technique while rendering the final piece."

Kasnot attained the luminescence in the painting by applying Com-Art transparent dyes to a brilliant white ground. He painstakingly prepared his painting surface—a sheet of heavy, handmade paper—with six coats of white Cel-Vinyl paint, which he sanded between coats. *Tip: The flexible, durable Cel-Vinyl paint, developed for cartoonists, will wrap around a color separator's drum without flaking.* Finally, Kasnot polished the final coat of Cel-Vinyl with pounce, a fine grit commonly used by draftsmen to degrease vellum prior to inking. The artist's treatment yielded a super-slick surface which offered no tooth for a frisket to yank away when peeled up.

TYPE IN PERSPECTIVE

"When art directors mention type," Kasnot laughs, "illustrators' eyes just roll up into the back of their heads. How are you going to render all that type? It's a battle we always face." Here's how Kasnot faced one such battle which required that he render the type in perspective—and won.

Manufacturers of cardiac diagnostic equipment often claim their computer read-outs are the next best thing to actually holding the patient's heart in your hand. Kasnot made this kind of hyperbole come to life by depicting hearts sprouting from the read-out sheets these machines produce.

From printouts provided by the client, Kasnot redrew the computer-generated heart diagrams as though the flat pictures were coming to life ❶. He then arranged his three sketches in a composition. On a tissue overlay he indicated in pencil the outlines of the sheets as he intended to paint them: in perspective, leaning back into the picture plane ❷.

To solve the problem of rendering the type in perspective, Kasnot sent his line sketch to Graphic Productions (see the following demonstration), along with the print-outs showing the type. Using the sketch as a guide, a photographer arranged the sheets so that they appeared on the focusing glass of his 4 x 5 view camera in the same perspective. By swinging and tilting the camera's lens board and film plane, the photographer was able to keep the tipped sheets in sharp focus from top to bottom. He then shot the type on Kodalith film.

From the negative, Kasnot had I.N.T. rubdowns (3M) made of the type, and when he finished airbrushing the hearts, he simply positioned the sheet of type on the painting and burnished down the text ❸. *Tip: Kasnot knew the final art would be color-separated from a transparency. Were it to be scanned, he would not have used rubdown transfers, as his experience is that they pop off or break when tightly wrapped around a drum.*

Instead of using rubdown transfers for the rest of the type, which would not be in perspective, and for an EKG tracing he planned to include in the art, he ordered airbrush friskets from Graphic Productions (refer again to the following demonstration). The friskets would give him the latitude of changing values on the type and modulating color on the EKG tracing as the picture developed.

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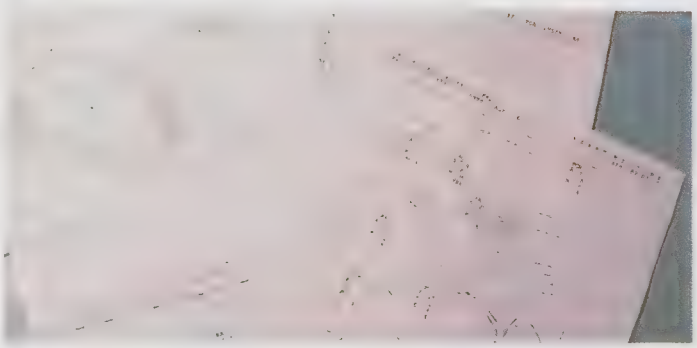

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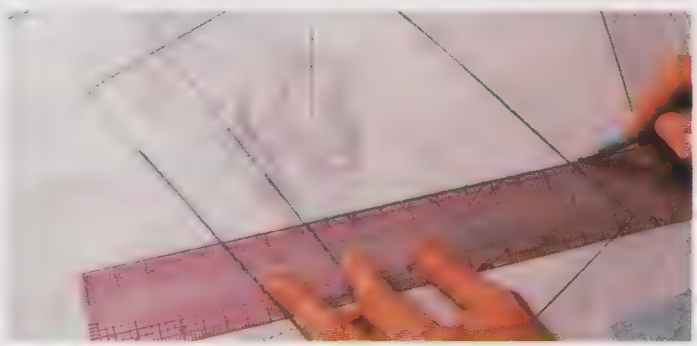

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Type in Perspective To render the type on this illustrated diagnostic read-out sheet, Kasnot hired a photographer to shoot the type in perspective on his 4 x 5 view camera, then had rubdown transfers made and burnished them onto his painting.

1 The client provided actual copies of the sheets produced by their diagnostic equipment. On a tracing paper overlay, Kasnot drew realistic versions of the heart in pencil, making them appear to be three-dimensional.

2 Next, Kasnot arranged his sketches as he wished them to appear in the composition: receding away from the viewer (note how the lines converge). The artist then had a photographer arrange the read-out sheets so they appeared on the focusing glass of a 4 x 5 view camera in Kasnot's sketched perspective. The photographer tilted the camera's lens and film plane to make sure the type was in focus.

3 From the negative, Kasnot had an I.N.T. (3M) custom dry transfer made of the type at 60 percent gray to approximate the washed-out look of the original sheet, then burnished it onto his final art.

An Electronic Solution To render this simulation of the respiratory system, Kasnot contacted an engineering firm which produced three grids in perspective using its CAD/CAM program. The lines in each grid decrease in width and value, simulating the graying and diminished contrast seen in aerial perspective.

AN ASSIGNMENT FOR THE COMPUTER

Some problems defy even Keith Kasnot's appreciable skill in working out perspective with a pencil, straightedge and ellipse templates.

Art director Tim McKeen (then of Klemptner Advertising, N.Y.) sent Kasnot a color marker comp in which a human body was metaphorically presented as three separate levels of translucent panes ❶. The respiratory system was pictured in colored neon tubes on the uppermost level, and the client's pharmaceutical product was portrayed as blips of light coursing through the entire configuration, which seemed to angle off into deep space.

Kasnot's assignment was to render this and prepare four more views of the same anatomy as seen from different perspectives. To work out the perspective of so many separate panes, keeping them equally sized and spaced, and on three different levels—and to do it four times!—was too daunting a task, even if aided by perspective charts. This, he recognized, was a job for a computer.

Kasnot conceived of creating a single set of panes on three levels, but he wanted grids much longer than the area of view in any one of the illustrations. On a different spot along the length of such an enlarged grid, he could arrange each of the five compositions. But who could prepare such a grid?

After several false starts, Kasnot found himself in an engineering contractor's office, negotiating to have the grids extended and plotted out using its CAD/CAM system (computer aided design/computer aided manufacturing). Kasnot emphasized that the grid wasn't merely a tilted checkerboard, but rather individual panes that had to be kept equally spaced as they receded. For $900 the firm produced three gridded 41x30-inch lengths of Herculene drafting film receding to a single vanishing point, far off to the right of the composition ❷. The lines, all rendered with mechanized technical pens, have different widths to simulate an "aerial perspective" (the graying and diminished contrast caused by viewing distant objects through interposed particle-laden air).

Kasnot then composed his pencil sketches on different portions of the Herculene sheets to achieve shifting perspectives, enlarging parts to convey a close-up.

RENDERING Kasnot's plan was to render the grid lines in an electric blue, then airbrush the remaining background black. He painted on a heavyweight Frisk CS-10 board because only a bright white ground under the transparent Com-Art dyes he uses could achieve the intense blue he envisioned.

Because there was no way he could cut a frisket to protect these lines from the black airbrush spray, he called Ken Fritz, owner of Graphic Productions, (Phoenix, Ariz.), who makes airbrush masks. Unlike traditional friskets, Fritz creates custom rubdown sheets from a client's line art work. The rubdown sheets are designed to be picked up again without breaking apart and leave no residue on the board ❸.

The process worked quite well, but Kasnot did hit a minor glitch. The rubdown frisket with the finest lines broke apart, allowing black spray to obliterate some of the deepest grid. He proceeded despite this and burnished down the middle and the closest grids, then sprayed the background black.

Kasnot peeled up the middle frisket and sprayed the exposed white lines royal blue. He was unconcerned about overspray because the Com-Art blue was undetectable against the black gouache. The closest grid remained protected by its frisket.

Next, Kasnot peeled up the closest frisket, which revealed the white board. He masked areas off with Frisk Film, painted the panes with the same royal blue, and then added white highlights. Finally, the artist re-established the fine lines of the deep grid (which were obliterated by the black) using blue transfer paper ❹.

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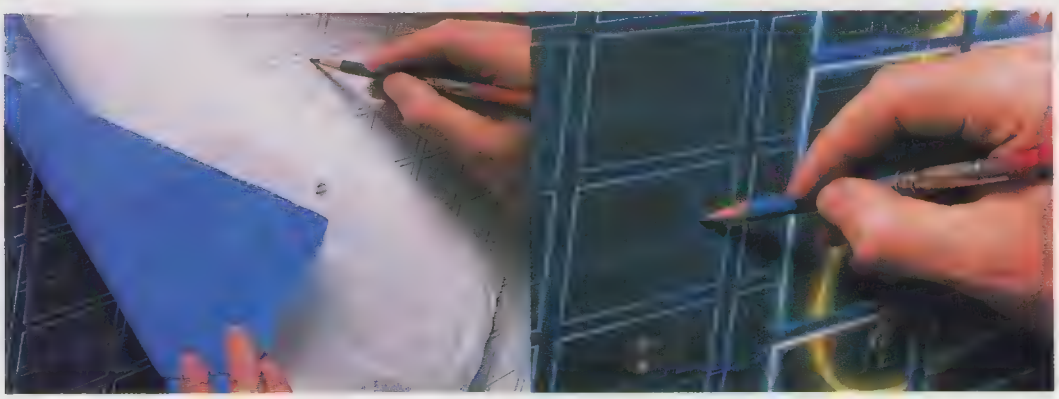


1 The art director sent Kasnot this marker sketch visualizing the human body metaphorically as three levels of translucent panes. To complicate matters, five separate illustrations were called for, each to be viewed from a different perspective and magnification. The additional views can be seen beneath the comp.

2 A CAD/CAM system plotted the grids on three 41-inch lengths of Herculene drafting film. To emphasize different spatial levels, the closest grid was plotted with a No. 4 point on a technical pen, the second grid with a No. 2 point, and the deepest grid with a No. 1 point.

3 Kasnot had Graphic Productions make rubdown airbrush masks directly from the plotted grids. To help the artist keep straight which grid he was airbrushing, each frisket was a different color. Kasnot then burnished down each grid, sprayed black around it and lifted away the frisket whole.

4 Kasnot reestablished the lines on the deepest grid by registering the plotted grid on the artwork. He slipped a sheet of blue transfer paper (one of several colors made by Saral) between them and transferred the lines. He then touched up the lines with Prismacolor pencil. ■

'Damp Brushing' with Gouache

Using tube and pan colors, Gerald Hodge achieves precision with thin layers of gouache applied with barely wet sable brushes.

By Daniel S. Cutler

Painting with Gouache Leopard Galls, growths which house moth larvae, are commonly found on the leaves of oak trees. Here Professor Gerald Hodge uses his "damp brush" gouache technique to render the spherical growths as they appear on oak leaves.

What could be new in techniques for handling a painting medium that was old hat to pharaohs' artists? Gouache, a suspension of pigments in gum arabic, often thought of as "opaque watercolor," was indeed used to decorate Egyptian papyri.

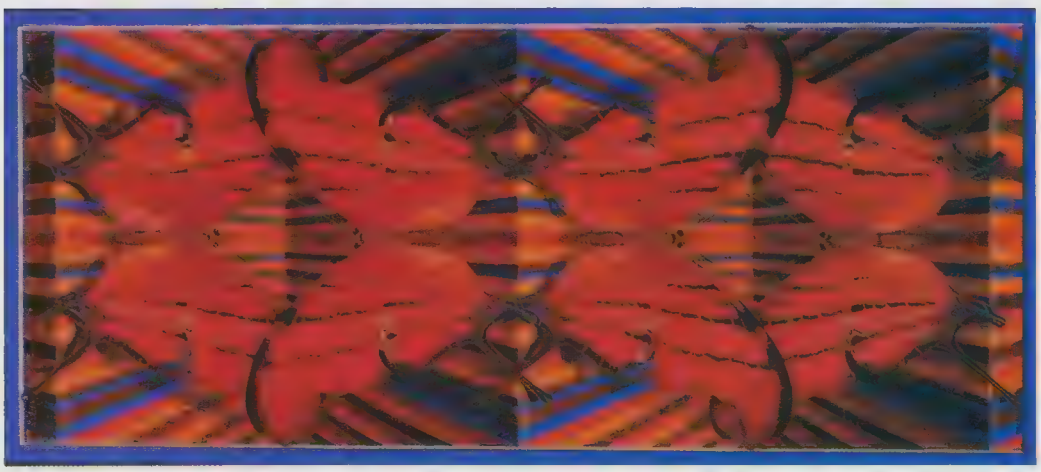
Well, "new" is a relative term. Gerald P. Hodge has now been teaching his idiosyncratic style of gouache dry brushing—better termed "damp brushing"—to two generations of medical artists. It is a technique he developed, motivated by a penchant for detailed work. Through his profound influence as an educator in a field where emulation of masters is an integral part of the curriculum, Hodge's manner with gouache has been widely adopted by scientific illustrators.

The ability to cover a dark color with a light one is the chief advantage to working with gouache, which well suits the medium for renderings of light subjects against a toned ground. Hodge often makes use of the strong spatial separation created by such tonal arrangement, both in his scientific illustrations and in his trompe l'oeil still life compositions.

A FEW POINTERS

Learning to mix gouache to just the proper viscosity is critical to the successful application of a smooth background, the first step in creating a gouache painting. Too thick a paint will crack and flake off; a thin application will be splotchy.

A large batch of color should be mixed at one time, as repairs to the background are often required, and it is nearly impossible to remix a color exactly. The paint should be thinned with water to the consistency of light cream and stored in a closed container, such as a baby food jar. *Tip: When you open a tube of gouache and the gum arabic has separated from the pigment, to remix it recap the tube and knead it.*



Spanish Still Life In this trompe l'oeil still life (top left), Hodge used a Velázquez-inspired gray-green for the background, then painted each element by laying down body color and modeling with blended drybrush strokes. The type is hand-lettered and the molded edge is painted—not an actual frame.

Atlas Moth Hodge used an airbrush (Paasche AB) to render the shadow under this giant moth (top right). Properly thinned gouache can also be used in a flexible nib pen; the stipples on this insect's wings were accomplished with a Hunt 659. The fine hairs were painted with a 000 sable brush.

Ruddy Daggerwing Abstraction This composition was done for fun. Hodge positioned the male *Marpesia petreus* against an invented background, folded to allow the butterfly to cast an interesting shadow (center). Each stripe was first painted a flat color before it was modeled.

Great Horned Owl Feather After painting the background of this illustration, Hodge rendered the feather in a light brown (bottom). It is easier to work from dark to light, he says, because the colors with more white in them are most opaque. Saved background color was drybrushed into the shadow to soften its edge.

Photos by David Koether

When painting backgrounds, Hodge teaches his students to quickly apply the fast-drying paint in rapid strokes with a broad, flat brush, crisscrossing in every direction. Splotched coverage may be repaired by repeating an application of thin paint, but only after the first coat is thoroughly dry. Never paint over a damp spot. It will lift and be difficult to repair.

THE TRANSFER Hodge produces his own transfer paper by scribbling on tracing paper with H graphite. He then wets a tissue with Bestine solvent and rubs it into the graphite. Once the tracing paper dries, Hodge slips it between his sketch and the toned paper. He retraces the drawing, transferring the graphite lines to his paper. He makes similar transfer sheets using pastel dust in place of the graphite. This provides the artist with unlimited color options for the initial lines on his final drawings. An added benefit of pastel is that the dust is readily absorbed into wet media, whereas graphite may have a tendency to repel a light wash.

For this demonstration, a painting of a Leopard Gall on an oak leaf, Hodge sidestepped the background painting by working directly on a gray sheet of screen-printed Color Aid paper.

PAINTING STRATEGY

In his lectures to students, Hodge points out that most forms can be broken down visually into three or four values. He encourages students to look for the middle tone of the subject, which is normally the local color in even light. In practice, however, Hodge usually finds it beneficial to mix a color slightly darker than the middle tone. The subsequent values blend better because there is more pigment.

To reproduce the tan of the Leopard Gall, Hodge mixed raw sienna with alizarin rose madder, cooled with a drop of cobalt blue. Then by adding permanent white, he was able to achieve just the right value ❶. When he found this mixture still too rosy, he neutralized it with a touch of brilliant green. (While Winsor & Newton cautions artists to use zinc white for the cleanest tints, Hodge prefers the "milky" effect permanent white produces).

Adjusting the tone of the gouache mixture can be tricky because the paint shifts value markedly as it dries. *Tip: Some colors will dry lighter, others darker. Never judge the values of your gouache paint mixtures when still wet. Test all colors before applying them.*

When the initial wash was complete, Hodge painted a cast shadow in a flat wash of gray ❷. (While the word "wash" is often used in reference to gouache paint, a gouache wash is opaque, not the watery glaze conjured up by the term's use in aquarelle painting.)

MODELING At this point Hodge usually instructs students to mix two or three values of the base color to be used for modeling. Tints can be created simply by adding white to the base color. But more interesting ef-

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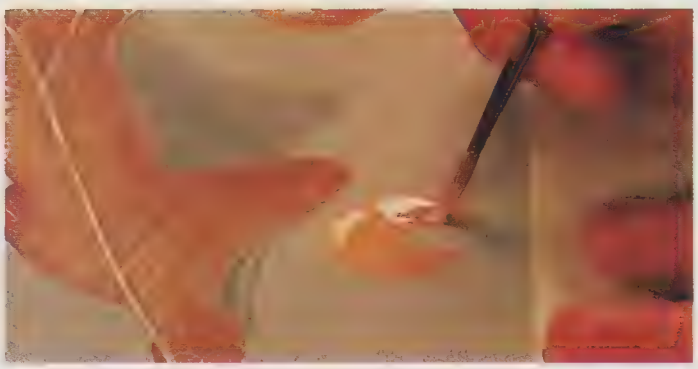

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1 Hodge first matches the hue of the tan Leopard Gall in Winsor & Newton tube Designers colors. To get the middle value, he adds permanent white. He mixes the colors on the board until he achieves a flat wash. Note the marked difference in the value of the wet gouache on his brush and the dried paint on the finished areas.

2 Using a No. 4 sable brush, Hodge defines the shadow with a flat application of Winsor & Newton cool gray No. 4. Note the napkin under his hand. "Finger oils [on the board] stain gouache," he cautions.

3 To model the spherical gall, Hodge picks up some yellow-orange on his wet sable brush, then squeezes most of the color out between his fingers as he fans the bristles. He applies the yellow onto the light side of the gall, then repeats the procedure with violet for the shadow side. He even brushes violet into the cast shadow.

fects may be attained with "chromatic" mixtures; adding a light value, but one that still has some chroma (Naples yellow, for example) may work in some tints. Similarly, black may be used to darken the base color; alizarin, blues or other dark colors produce richer shades. After laying down flat areas of tone, Hodge teaches students to blend the separate values by drybrushing adjacent values into one another (see below).

In rendering this spherical gall, however, Hodge bypassed tints and shades of the base mixture and proceeded directly to the next step of his painting technique: "drybrushing" glazes of pure color. The term is misleading, though, because Hodge works with a damp brush.

DAMP BRUSHING Setting aside his tube colors, Hodge switches to gouache in pans because he finds them more convenient. For this painting, he uses German-made Marabu colors; he also likes Pelikan paints.

With a sable brush wet with clean water, Hodge picks up pigment from the pan. Then, between his thumb and forefinger, he squeezes almost all the paint from the brush as he fans the bristles. Each stroke of the brush across the painting will now leave a subtle streak of pure, but dilute color. This is the same method Hodge uses to blend adjacent values of the body color.

Hodge always introduces warm tones—yellows, pinks, oranges—into the lit portions of his paintings; for the shadow side he uses cool blues, purples and greens ❸.

Using a damp brush, he then blends the colors ❹. Some artists prefer to alter the direction of their brush strokes to achieve a random, overall pattern. On the other hand, the subtle, linear drybrush strokes may be employed to assist in modeling an object by following the directional changes of its surface.

Hodge then adds the gall's spots and a highlight ❺. *Tip: Softening the highlight conveys the impression of a surface with a dull sheen. A hard-edged highlight makes the object appear glossy.* Because a good point is critical to his finely detailed paintings, Hodge always uses Winsor & Newton series 7 sable brushes for detailed work.

Finally, the artist adjusts the spots on the gall ❻. The warm tint, coupled with the highlight, were all that were needed to model the small sphere. A larger or more dramatically lit sphere would require tints or shades of the body colors for a fuller roundness. Hodge would have blended these with drybrush washes of adjacent values.

EASY PRECISION Gouache can be problematic because it is prone to cracking, and it is difficult to judge and match colors. But for ease of use and unmatched ability to render even the most precise details, it has few rivals. ■

Illustrator and freelance writer Daniel S. Cutler is a frequent contributor to Step-By-Step Graphics.

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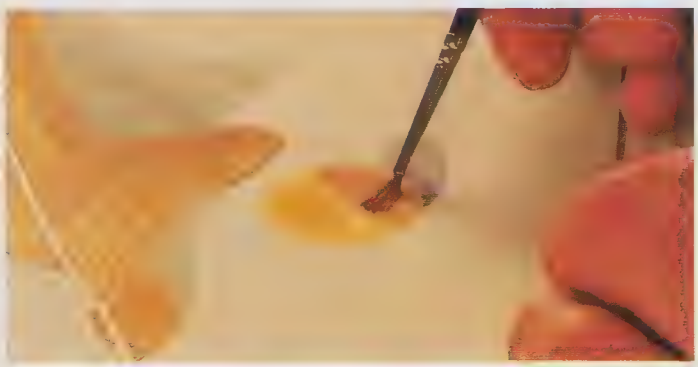

4 With his brush barely damp with clean water, Hodge blends the warm light and cool shadow, stroking along the cross-contours of the sphere. The subtle linear marks left by the brush hairs in this technique help emphasize the form.

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5 After adding the spots of color with burnt sienna and violet, Hodge now adds a specular highlight to suggest the light source. Here he dabs on permanent white and drags out the thick paint to feather and thereby soften the edge.

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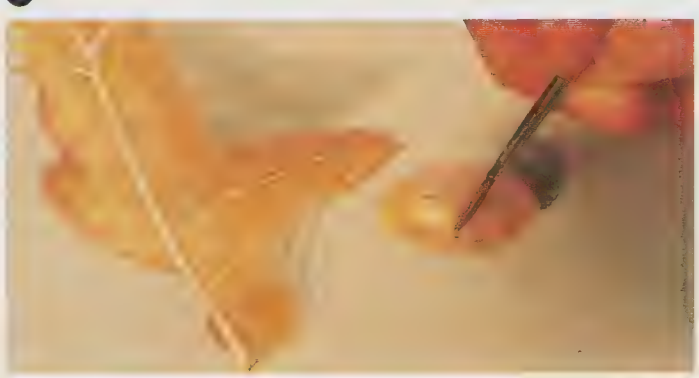


6 Working very closely, Hodge adjusts the color on the spots with a mixture of the base color darkened with raw sienna and a little violet. He feathers the edge of the cast shadow to complete the work.

'Speedy' Illustration Techniques

These tips and tricks employing traditional media can save time and yield fascinating results.

By Bill Vann

As an illustrator working primarily in the Midwest, I've had more opportunities for experimenting with techniques than if I had lived on either coast. In my area, your portfolio can contain more than one style and often times has to, if you want to remain busy all the time.

In the process, I have discovered and come to rely on certain proven illustration techniques that have saved me hundreds of hours. And since I really prefer to spend more time on concept and drawing, executing the finish in two days or less no matter how complicated the visual, these "speedy" techniques have become crucial to my modus operandi. In this article, I will share six of my most useful approaches.

These techniques all require practice. Try them out on some personal work before you use them on a paying job. Once you become confident and comfortable in their execution, you will find yourself completing your assignments in shorter time periods with some rather fascinating results.

Tip: One tool which is essential to all of my techniques is a good quality plain paper copier, one that allows you to run your own paper through it. The larger the paper size it will accept, the better. My personal choice (the Canon 1824 Zoomer, Graphic Enterprises) can handle any paper up to a two-ply in weight and 18 x 24-inches in size.)

Bill Vann is a St. Louis-based illustrator who works for clients nationwide. He is also an instructor for DGEF.

Bleaching Out You can create an illustration on colored paper (as shown above) and still achieve the effect of working on white board by first bleaching the color out of certain areas of the paper.

1 At left is my original tissue drawing; at center is the pencil rough approved by the client; and at right is a photocopied version of the tissue drawing on Canson paper. Here I am using a synthetic brush dipped in laundry bleach to remove color from the paper in specific areas.

2 Now I cover parts of the background with flat black acrylic paint.

3 Transparent and opaque colors are laid down in the bleached areas.

4 After final detailing with acrylics, colored pencil and airbrushing, the art is complete. An overlay with the product and product name are placed to simulate the printed piece. This illustration required 30 minutes for pencil rendering and four hours for painting.

BLEACHING OUT TONE ON COLORED PAPER STOCK

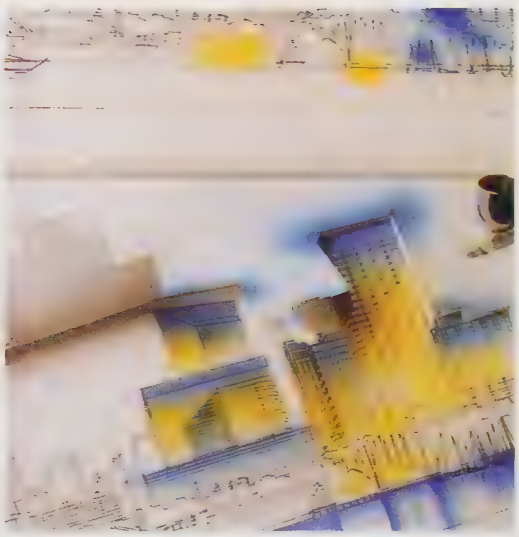
Sometimes I want to create an illustration on a colored background because of the interesting effects I can achieve. Using a colored paper stock is an obvious solution, but the color of the paper interferes with any transparent colors I apply to the sheet. To get around this problem, I use common laundry bleach to take the color out of the paper in specific areas.

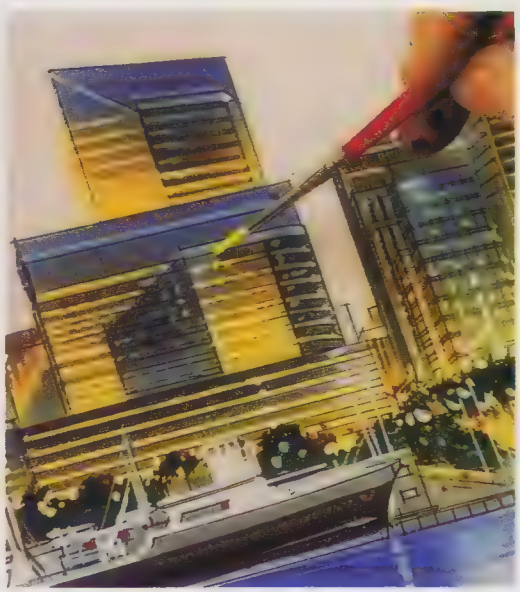
First, I carefully make a detailed line drawing in pencil on tissue or vellum. This is photocopied onto a colored sheet, like Canson paper. *Tip: Canson paper is thin enough to run through the copier and to allow the fusing element (heat) to make the image permanent. Some papers (between one-and two-ply in weight) will not allow the toner to fuse properly. If you find you can smudge the image or partially erase it, you need to send it through the fuser a second time, or spray it lightly with fix.*

After dry mounting or spray gluing (I use 3M-77 Super) the paper onto board, I begin to remove the paper color with ordinary bleach, full strength or diluted with water. The more diluted the bleach, the less paper color will actually be removed. Full-strength bleach will take some paper colors out to a near white, while other paper colors will only bleach back 50 to 75 percent. Papers which carry the most pigment (darks or brights) yield the most dramatic results. *Tip: While you are applying the bleach, only use synthetic brushes as sable hair will melt.*

After I have removed whatever color the painting calls for, I use Luma dyes, acrylics and colored pencils to completely cover the sheet in an opaque manner, or I can let the paper color become an integral part of the illustration by treating the media more transparently.

Photos by Mike Feher





Paper Friskets Bleach works equally well with dyes, especially when combined with an easy method for cutting friskets. I can restore the white of the paper, allowing me to add highlights or more colors quickly without cutting tiny or involved friskets. For this project, a series of 24 cityscapes, I had to work very quickly, and could allot only four to six hours per piece.

1 First, I photocopy my tissue drawing onto two-ply bristol. I also make several copies on regular bond paper which I will use as friskets while I add color.

2 With the help of the paper friskets (which, of course, match the art perfectly), I begin applying Luma dyes with an airbrush immediately.

3 Using a synthetic brush and laundry bleach, I removed some of the graduated color in preparation for overspraying more color.

4 After applying several more layers of color, I return to brushwork, adding details with Pelikan Plaka opaque gouache.

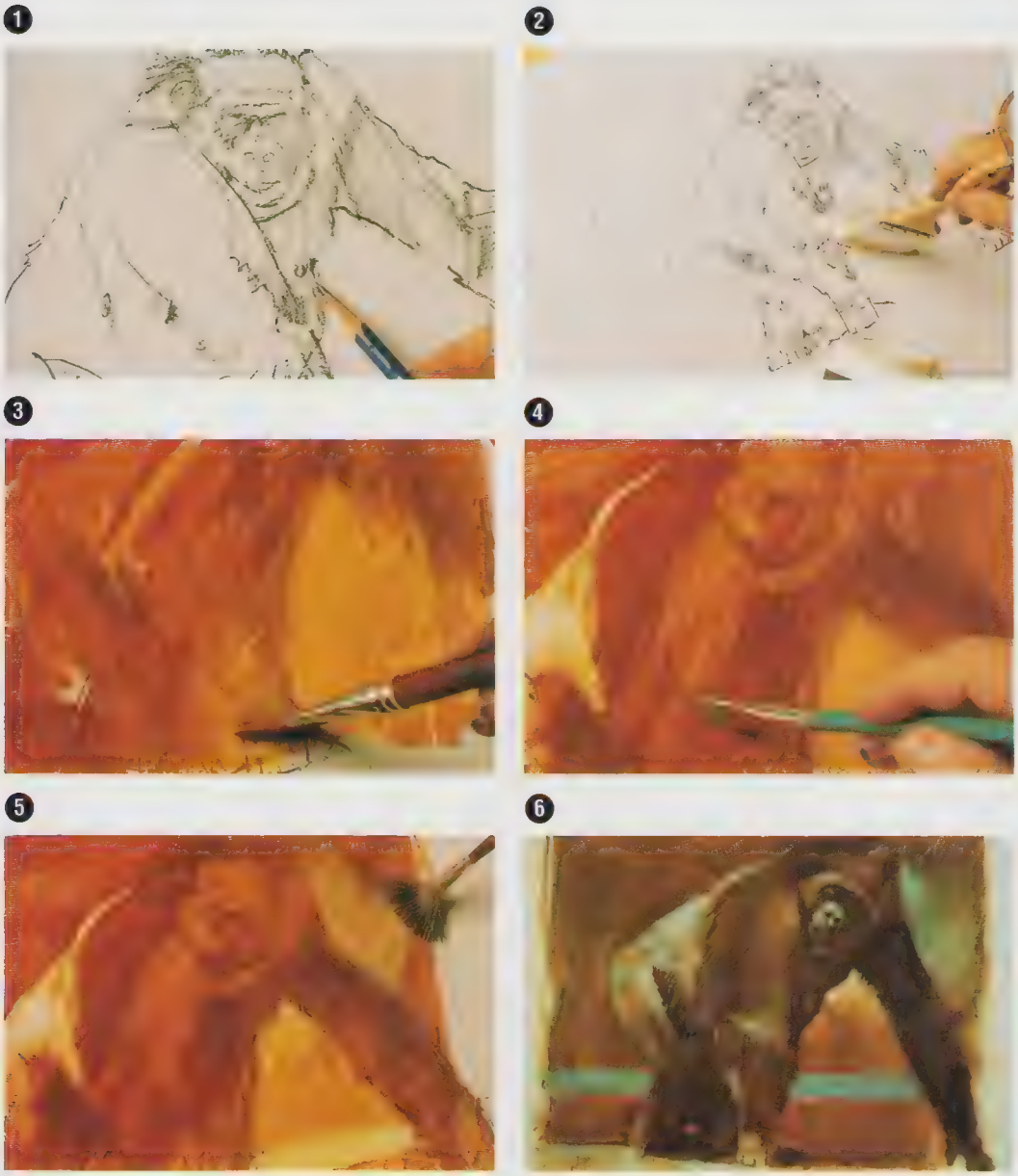
5 The finished piece required one hour for pencil rendering and five hours for painting.

EASY FRISKETING USING STANDARD PHOTOCOPIES

Another "quickie" technique involving bleach lets me work rapidly with dyes and an airbrush, and avoid tedious frisket cutting. Again, I start with a detailed pencil drawing on tissue, but then I photocopy it onto one- or two-ply, plate-finish bristol board. At the same time I make several extra copies of the same drawing onto regular bond paper; I will use these as paper friskets later on. *Tip: Make the frisket copies on larger sheets of paper, positioning the image near the center, to protect the outside areas of the original painting from overspray.*

Using a sharp swivel knife on one of the friskets, I cut out the image area where I intend to use the airbrush and then lay the mask over the Strathmore copy. I tape down one or two sides of the mask and begin to spray the appropriate Luma dye color into the unmasked area. Finger pressure is all that is needed to hold down the edge of the paper mask as you move from area to area. With a detailed/or complicated mask, a small amount of repositionable spray glue on the back may help, but use it sparingly, as any residue left on the final art could pose a problem later on.

Next, I apply bleach to remove color from specific areas that need highlights or where I intend to overspray a second glaze of color for a new tonal effect. The bleach works equally well on the dyes as it did on the colored paper. When all the transparent dyes have been airbrushed onto the Strathmore sheet, I fix the art and begin to use opaque gouache and acrylics to finish up the details.



Gouache Lift-Out By employing one simple initial step, this gouache lift-out technique allows you to work very quickly, preserve your original sketch in the event of disaster, and achieve texture in your paint without applying thick layers which take hours to dry.

1 I sketched the gorilla in about 15 minutes onto cold press illustration board using a soft 2B pencil. I keep the drawing loose and sketchy because I will add texture later. At this point, you can photocopy your art onto illustration board, dry mount a photocopy onto a board or decide to work with your original sketch.

2 Next, I use two or three coats of workable fixative to make sure the original drawing is sealed. Then I apply healthy amounts of acrylic gel medium directly over the sketch. When dry, the acrylic gel will provide the illustration's texture, so I am mindful of the direction of my strokes. *Tip: Put a few strokes of the gel in the shape of an "x" on the back of the piece to minimize warpage as the piece dries.*

3 When the gel medium has dried completely, the drawing underneath is protected, and I can begin to add color. I keep my gouache thin enough so I can still see the drawing underneath. This is the fun stage where I can move color around with a fairly wide brush.

4 Now I lift out certain areas of color with a brush and plain water. Color can be removed completely or partially.

5 Here I am using a fan brush, which I like because it doesn't allow me to work too tight. I find it useful for creating texture and removing paint. Paper towels, cotton swabs, anything that will hold water is a viable tool.

6 The finished illustration shows the addition of some cool colors to contrast with the initial warm colors. The painting portion of this piece took one hour to complete.

GOUACHE LIFT-OUT TECHNIQUE FOR EASY CORRECTIONS

This technique, which combines gouache over acrylic gel, is especially handy when you truly can't afford the time to start over. First, I draw directly onto illustration board or dry mount a photocopy of the same art onto board, fix the drawing with a heavy application of spray fix and allow it to dry completely. Then I apply acrylic gel medium (not matte medium) full strength over the entire drawing using a wide bristle brush for texture. I use brush strokes that create a lively directional pattern to the final art. *Tip: With enough texture and a heavy application of opaque or semi-opaque paint later, you can mimic the appearance of oil or impasto painting.* The gel can be worked for several minutes before it begins to dry and drag on the brush. When this happens, stop immediately and let it dry completely; a second layer of gel can be added after the first dries. Make an "x" on the back of the board, applying a thin coat of the gel corner-to-corner, before drying to prevent the sheet or board from warping. Very heavy applications of the gel require a much longer drying time.

Now the drawing is completely sealed and protected. After testing for dryness, I can begin to apply water-based pigments (gouache or transparent watercolor) with either brush or airbrush, working from dark to light, and from thin to thick. At any point, I can totally or partially remove the color with water and a sponge. New color can be reapplied and lifted out again and again. I protect areas I do not want changed with a coat of fixative.

Markers and Spray Fixative The chemical components in markers and spray fixative can be combined to attain some simple, yet interesting effects.

1 First, I rendered a pencil drawing on a heavyweight tracing paper and fixed it heavily. (You can also lay a clean sheet of vellum or tracing paper over your sketch and use the "underlay" as a guide for adding color.) Here I have spray mounted my drawing onto a board for stability and have begun to lay in blocky areas of color with solvent-based markers.

2 Next I use a blender marker to thin out color and move it around; this is a very experimental stage.

3 Using lighter fluid and a brush, I create light areas in the color.

4 To break up solid areas of color and add texture, I apply a heavy coat of Krylon workable fixative. The color flows and runs, almost forming a wash. While the color is fluid, you can tilt the board back and forth to create interesting effects.

5 Here I do some clean-up with opaque paints, flattening out some areas. Notice the spattering in the green area: I created this by pushing down and pulling back on the fixative can nozzle and letting it "spit" onto the art.

6 Despite the high degree of color and texture in the finished piece, printers have had no trouble separating art produced in this manner. The pencil sketch for this piece took 1½ hours, the painting portion took 5½ hours.

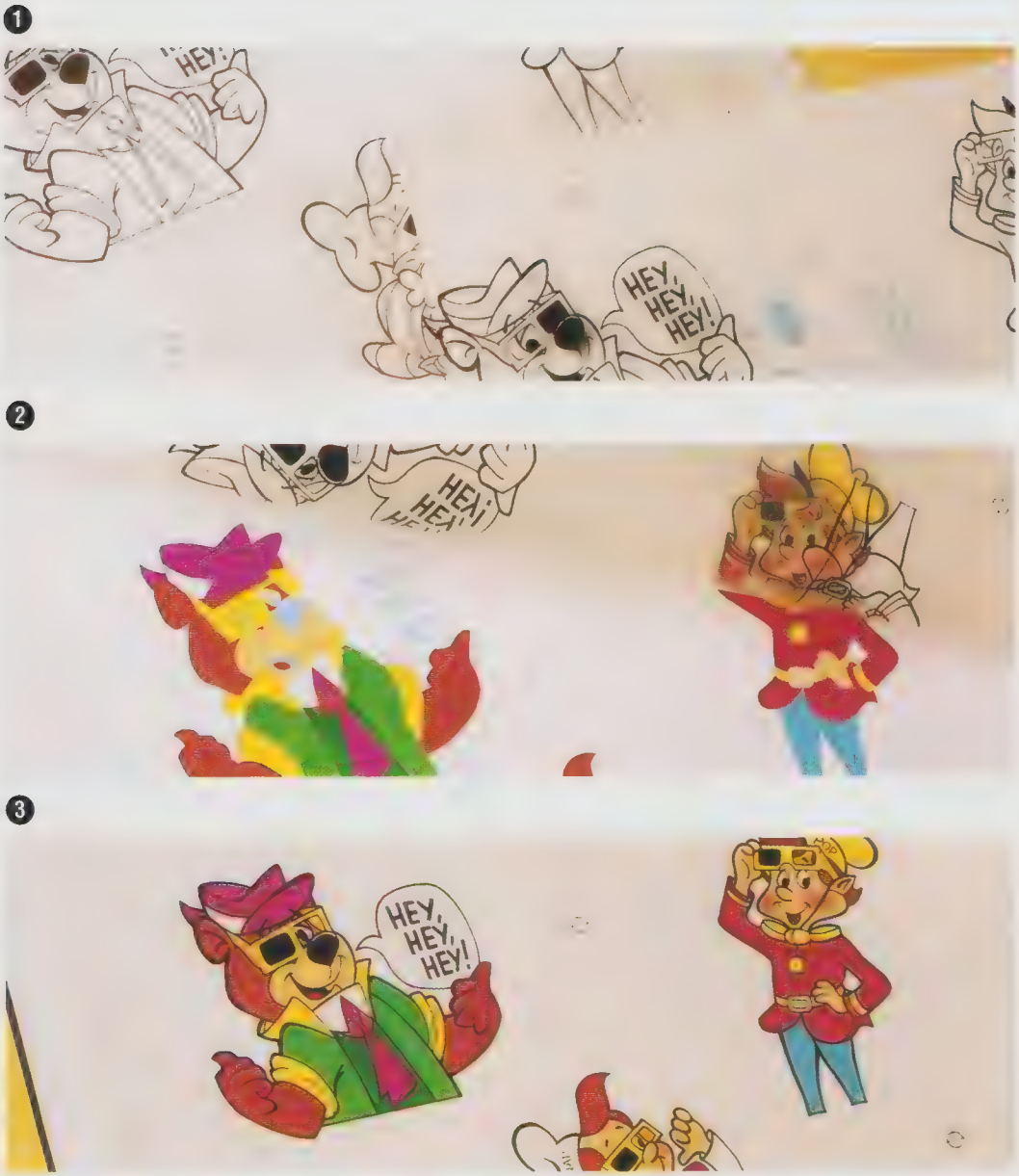
MANIPULATING MARKERS WITH SPRAY FIXATIVE

Illustrators sometimes disregard markers as a medium for final rendering because of their choppy, uneven application of color. But the rich, vibrant colors markers provide plus their ease of use can't be ignored. This somewhat experimental technique requires some practice, but it takes advantage of this quick source of luscious color while creating smooth tone.

First, I create a drawing that will be used as an underlay. Laying a sheet of tissue or vellum over the taped-down drawing, I begin to loosely apply areas of color to the top sheet with solvent-based markers; there is no need to stay "inside the lines."

After covering those sections I want to protect with a loose frisket of torn tissue, I begin to pick-up or move the color with the use of workable fixative on cotton swabs, paper towels or synthetic brushes. Sometimes I spray the fixative directly onto my brush or swab; sometimes I spray a small puddle of it onto clean tissue and use the liquid like paint. Textures can be created by spritzing an area with workable fixative (gently press down on the nozzle, pulling back at the same time), or I can flood an area of several colors with fixative and let them all run together. A colorless blender can also be used at this stage, as can common lighter fluid applied with a brush or swab.

After this has dried, I can go back into these area with more fix and lift out color back to the white of the paper, if necessary. *Tip: For outlines or other areas you want to remain permanent, use water-based markers or pens, as the fixative does not affect them.*



Blueline Template This technique, which combines a film positive and a painted blueline "underlay," is very similar to cel painting in animation. It provides an easy "out" if you make a mistake while painting and provides a crisp final.

1 My original art, ink on vellum, is in the upper left-hand corner. At right is the film positive laying on top of a blueline board, which is actually a CS-10 airbrush board that has been chemically treated to accept a blueline image. Since they were made from the same film negative, the film positive and the blueline register perfectly.

2 I complete all of my airbrushing on the blueline board. The blueline image makes it easy to see how to cut my friskets.

3 Once complete, I register the line art to the board (shown here). The ink rendering for the piece took two hours to complete; the painting took four hours to complete. This can be shot as reflective art, or, for a crisper final, the color base art can be separated and the black line overlay stripped in so that the black line won't carry a dot pattern.

PAINTING DIRECTLY ON A BLUELINE TEMPLATE

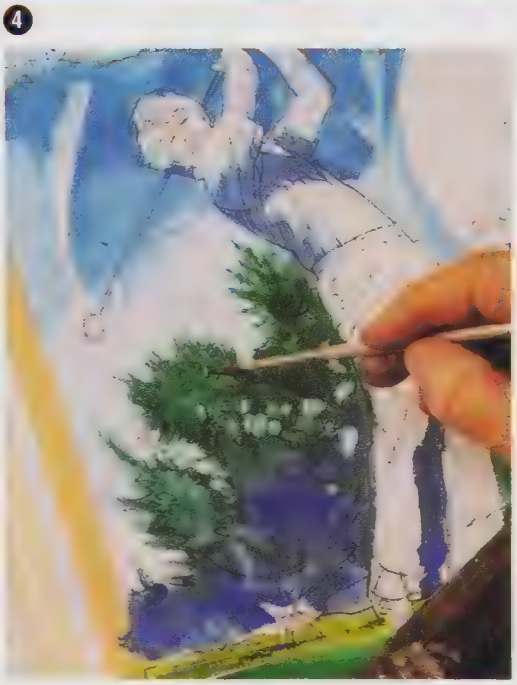
Most illustrators are aware of "non-repro bluelines," but few take advantage of them in their work. After airbrushing color directly onto a blueline version of your art, you can feel confident that if you make a major mistake, you can easily start over with a new blueline. In addition, the final reproduction of the linework in your art will be improved.

I start with a good black ink drawing in outline form, the cleaner and sharper, the better. Then I order a "blueline" copy of the art on CS-10 Frisk airbrush board (the blueline version is made from a film negative of the line art). I also order a matching film positive, which will register perfectly with the blueline copy and later be used as an overlay on top of the color. *Tip: Be certain to include register marks on your original line art to make the registration easier.*

Using standard friskets, an airbrush and acrylic color, I then proceed to paint the blueline image on the CS-10 board using the blueline as my guide (or edge). The non-repro-blue image lines are completely covered.

This technique has another benefit: If I happen to make a mistake while painting, I simply order a new blueline and begin again. Once the painting is complete, I simply position the film positive over the art for the full, four-color effect.

When the art eventually goes to the separator, the four-color blueline base art can be color separated conventionally, and the film positive can be scanned as line art on the black plate. The result is a punchier printed piece because no dot will appear in the black outline.



Mock Oil Painting This technique relies on a canvas-textured sheet and water-based media to create the appearance of oil painting without the long drying times.

1 First I copied my original tissue drawing onto a canvas pad sheet (I use either Fredrix or Morilla pads). Before I apply any paint, I lightly fix the photocopy to prevent the toner from smudging. To get rid of shellac build-up from the fix which could cause beading when paint is applied, I gently bathe the sheet with plain water and a sponge.

2 Here I am loosely applying thinned-out opaque watercolor. At top right, I have used the same color in my airbrush to flatten out some areas.

3 Now I begin to remove color from the illustration with a paper towel dipped in water. I use dampened cotton swabs to lift out small areas.

4 For extremely detailed lift-outs, I switch to a very small sable brush.

5 In the finished piece, I have used acrylics for added texture. The "strobes" on the ball and golf club were created with an airbrush and simple bond paper friskets. The penciled portion of the art was created in one hour, and the painting required 6½ hours.

MOCK OIL PAINTING WITH GOUACHE AND ACRYLICS

This is another timesaving technique that will provide the look of oils on canvas, with none of the tedious drying times. It is based on using a canvas-textured sheet with gouache and acrylic paints.

Once I have my completed drawing, I photocopy it onto a single sheet of canvas pad paper (Fredrix or Morilla) by hand-feeding it through my copier. *Tip: You may find that you have to fix the image since the fuser doesn't work as well on this heavy paper (it's textured and has an acrylic gesso primer). You will also have to do a little clean-up with a kneaded eraser on the copy before you lightly fix the image and prepare it for the gouache application.*

After applying two or three very light coats of fixative to secure the toner, I mount the canvas sheet onto board, and, using plain water and a sponge, gently wash down the entire image. The gentle bath does not harm the toner, but it removes any shellac build-up from the fix; it allows the gouache to go down without beading up.

Next I loosely apply transparent or semi-opaque watercolor, working very quickly. Mistakes are corrected and refinements made as I lift off color using cotton swabs, paper towels or brushes dipped in water. I work dark to light, thin to thick.

After taking away all of the color I chose to, I can switch over to acrylics for some fun in applying heavier pigment. ■

Digital Techniques

Illustration Software: A Visual Essay

A basic overview of programs and how artists are using them.

By Janet Ashford

Software for desktop graphics has come a long way since MacPaint. The earliest programs were great fun to use but produced rather primitive printed results. Resolution was limited to the coarse 72 dots per inch (dpi) seen on screen, so curves and diagonal lines were marred by visible stair-stepping of pixels. This "bitty" look characterized the medium at first, and added to the charm of some early illustrations, like a MacPaint image created by John Hersey in 1985 ❶.

Today, only seven years later, graphics programs have become so sophisticated that the best computer work is almost indistinguishable from art produced by conventional means. Marc Yankus used to create photo-collages by painstakingly cutting photocopied clip art with a knife, hand-coloring it and pasting it together. Now all these functions are available in the image-editing program he uses. He can produce illustrations in the same style, but in less time and with more flexibility ❷. Yankus' style has not been changed greatly by the new medium, but like Hersey, for example, the computer has opened the door to new and different modes of expression.

The two basic types of computer illustration are bitmapped (paint) and object-oriented (draw). *Tip: In PC circles, the two are often distinguished as "raster" and "vector."* The difference has to do with the way the computer encodes the information that describes the image. In a paint program, images consist of a map of tiny pixels or bits, much like a pointillist painting. From a distance, the pixels coalesce into a readable image. But from close up, they look like a random pattern of dots on a grid. A bitmap is dumb; that is, the computer knows only that certain pixels are on or off, but does not know whether the pattern thus created adds up to a circle or square. By contrast, in an object-oriented program each line or shape is represented in memory as a logical, mathematical entity. Objects can be easily transformed and repositioned, without disturbing other objects in the image. (See the demonstration opposite.)

Object-oriented programs, particularly those based on the PostScript language, are used when precision, control and high-resolution output are required. These programs are used for editorial illustration (especially when a clean, hard-edged or airbrushed style is wanted) and for technical illustration, maps, charts, product illustration, packaging design, page design, custom typography and logos. By contrast, most paint and image-editing applications are used for editing scanned photos, combining different photographic sources into realistic or surrealist composite images, and producing original illustrations with a softer, more "painterly," fine arts look.

The professional illustrator working in color should have at least one of each program: a PostScript illustration program, like FreeHand or Illustrator on the Mac, and Corel Draw on the PC, and either an advanced paint program or an image-editing program, like PixelPaint Professional, Painter, Photoshop or ColorStudio for the Mac, or Lumena, PhotoStyler or Image-In Color for the PC. For those with a limited budget, an all-purpose program combining paint, draw and image-editing programs, like SuperPaint or UltraPaint, may be adequate.

POSTSCRIPT PROGRAMS

PostScript illustration programs are object-oriented draw programs based on the powerful PostScript page-description language. All lines and shapes are mathematical entities described by a series of Bezier points connected by lines or

Editor's Note: This survey article serves as an introduction to the "Digital Techniques" section of this issue, and only highlights the features of some (and certainly not all) of the illustration-related applications in use today; it should not be considered, by any means, a comprehensive listing of programs or their features.

PAINT

A

B

C

DRAW

D

E

F

Illustrations by Janet Ashford

Paint vs. Draw A paint image or bitmap is made up of a grid of pixels, each of which can be either black or white (1-bit mode), any of 256 shades of gray or color (grayscale or 8-bit color mode), or any of more than 16 million colors (24-bit color mode). The author of this article used PixelPaint and Photoshop to create and edit a paint image of a chair. Because the image was created using soft "brushes" and blurring filters, it has the subtle, painterly look of traditional media (A). Paint images can be edited and reworked in a variety of ways, but because of the underlying pixel grid, when part of a bitmapped image is selected and moved, a "hole" is left behind where the pixels have defaulted to white (B). However, because color is represented pixel by pixel, it is easy to apply global color changes to a bitmap. We substituted a solid background for the gradated fill in the original image and then used the Invert feature in Photoshop to change each color in our chair image to its opposite (C).

A "draw" or object-oriented image is made up of lines and shapes which are represented mathematically in the computer's memory. Draw objects can be easily resized, transformed and moved without affecting other objects or backgrounds. The author used FreeHand to create a PostScript illustration of the same Mexican chair. Because it is composed of many colored shapes layered over each other, the graphic looks clean and hard-edged (D). When the chair is moved, the underlying background is revealed. Because the shapes are like stacked pieces of cut paper, there is no hole left behind when objects are moved (E). PostScript's flexibility makes it possible to edit and rearrange part of an illustration to create a new one (F).

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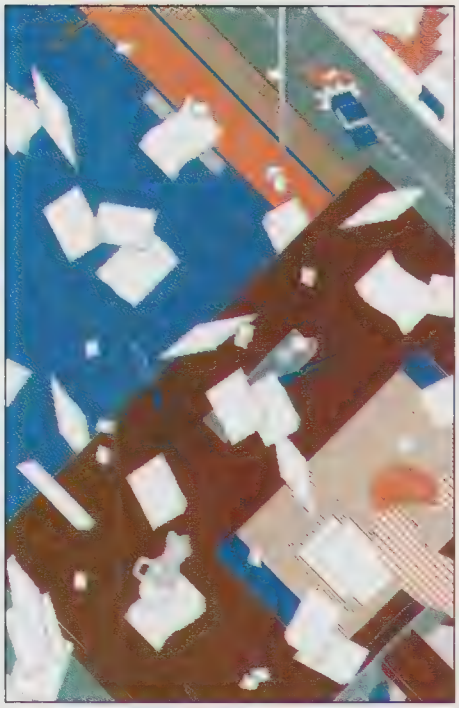

1 In just seven years, computer software and illustration styles have matured tremendously. John Hersey's MacPaint illustration for *MacWorld* in 1985 was one of the first published illustrations created with desktop illustration software (above left). Hersey added color by inking his own overlays. Hersey's current work, like this piece done in FreeHand (above right) is more complex and can be printed in full-color using separations generated directly from the computer.

curves. Each point determines the angle, direction or amount of curvature of the line segments on either side of the point, and each comes with a set of handles for editing these parameters. Illustrations can be printed at any resolution, dependent only on the output device, and become more smoothly rendered as the resolution increases.

Because of PostScript's flexibility, art created in PostScript illustration programs can be easily adapted to new formats by resizing, positioning, distorting, and adding or deleting elements of an illustration. Art drawn for a record album cover, for example, can be adapted to fit the different proportions of the CD package, cassette cover, poster, billboard or print ad.

The major PostScript programs share most of the important features which characterize this medium:

- Uniform straight or dashed lines in any weight or color;
- Basic tools for creating geometrical shapes;
- A freehand tool for freeform drawings;
- Transformation of objects (scale, rotate, skew, reflect);
- Alignment and distribution functions to help automate technical drawing;
- Import of bitmap scans as drawing "templates";
- Import of black-and-white and color bitmaps for placement as part of an illustration;
- Masking functions that clip patterns or images into other shapes, including type;
- Smooth color gradations;
- Blends from one color and/or shape to another;
- An autotrace function;
- Standard color libraries;
- Four-color or spot color separations at high resolution;
- Advanced type handling, including control of size, leading, kerning, word and letterspacing; the ability to convert PostScript font characters into font outlines that function as graphic objects; and the ability to set text on a curved or irregular path ❸, ❹.

FREEHAND 3 (ALDUS) FreeHand (for the Macintosh and PC) has all the basic capabilities listed above, plus some important features that its competitors lack. In FreeHand you can edit and draw in both keyline and preview modes, without having to switch back and forth. This makes it much easier to see and interact with the image as you work, especially with complex illustrations containing many gradations. FreeHand also provides a layering system that makes it possible to assign different elements of a drawing, up to 99 different user-named layers, making it easier to select and edit parts of a complex illustration. A style palette allows users to create named styles with a variety of line, color and fill specifications so that a single click on the name will assign all these attributes to a selected object. One hundred levels of Undo and Redo are available, so if you find you have taken a wrong turn, you can go backward or forward through your own steps ❶, ❹.

ILLUSTRATOR 3 (ADOBE) The first of its kind, Illustrator is a high-end professional PostScript illustration program that has been in use since 1987. Available for the Mac and the PC, it includes all of the functions listed previously—and with version 3 for the Mac, text can be entered directly into art rather than into a dialog box, as you must do with FreeHand. You can now import text from a word processor and link it so that it flows from one text area to another. In effect, with this feature, Illustrator can function as a page layout program.

Some drawbacks include the lack of multiple levels of Undo, the lack of a layering system for selecting and editing parts of a complex image, and the inability to draw in full-color preview mode. But dedicated users have found a variety of ways to work around these limits.

COREL DRAW 2 (COREL) Now the leader in sales in the IBM world, Corel Draw for the PC includes all of the PostScript functions listed previously, plus a library of 153 Corel typefaces. A special utility can be used to convert Adobe and Bitstream fonts to Corel format. Some unique features include "envelopes" which transform text or objects by fitting them into a different shape, an extrude function for producing 3-D effects, and the ability to generate perspective and vanishing points. These useful functions can be applied to type as

well as to graphics.

STREAMLINE 2 (ADOBE) Streamline (for the Mac and PC) is a dedicated autotracing program used for converting black-and-white line art and continuous tone art into PostScript line art. The converted file can be used as is or opened in Illustrator or FreeHand for further editing. In addition, Streamline allows you to specify and automatically assign colors to the black and white areas of a converted illustration. And grayscale photos can be converted to line art using the program's various contrast thresholds or to 4-, 8- or 16-level posterizations.

FONTOGRAPHER (ALTSYS) Many graphic designers use Fontographer, a type design and editing program (for the Mac), as an illustration tool, because in addition to being able to develop PostScript fonts for the Mac, PC or the NeXT, the program also allows you to autotrace scanned images, to incorporate PostScript artwork, and to create new designs from start to finish, using the program's drawing tools. For example, if you are illustrating a logo, you can use your reference as a template; or if you want to base your own design on an existing typeface, Fontographer will allow you to import existing typefaces and modify them.

FONTSTUDIO (LETRASET) Another font creation and editing application, FontStudio (for the Mac) allows the artist to create PostScript fonts and includes a set of drawing tools. And like Fontographer, you can import existing typefaces or use scans as templates that can be autotraced within the program.

TYPESTYLER 2 (BRODERBUND) This special effects type program for the Mac can be used alone or can work with paint and PostScript draw and page layout programs. It supports 24-bit color and with it you can illustrate logos, headlines and signage with a variety of custom effects like rotate, drop shadows, perspective and gradient fills, to name just a few.

LETRASTUDIO 2 (LETRASET) Like TypeStyler, LetraStudio for the Mac allows importing of PostScript fonts and offers a wide variety of special effects for creating illustrative approaches to your display lettering.

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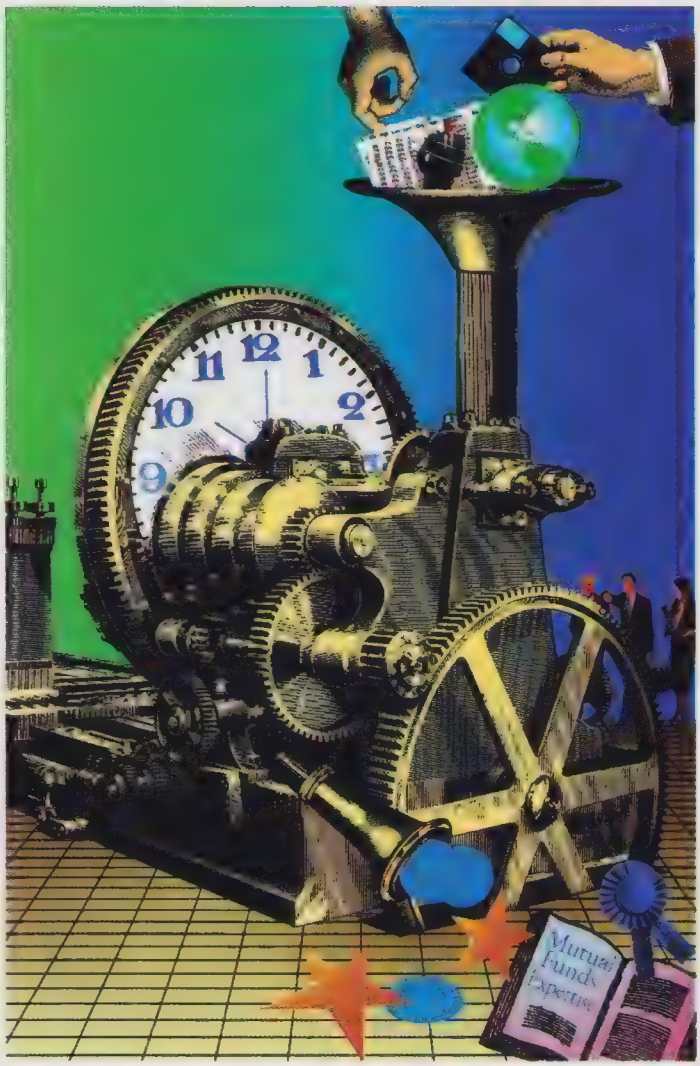

2 Marc Yankus once relied on a knife to execute his surrealistic photocollages. Now Yankus uses Photoshop to produce the same effects in less time. For this Price Waterhouse illustration, created in 1991, Yankus scanned etchings drawn from 19th-century sources, combined them with more contemporary images, and added solid and graduated color.

DRAW PROGRAMS

What is the difference between today's object-oriented draw programs and PostScript illustration applications? They are actually quite similar, but non-PostScript draw programs lack some of PostScript's high-end functions. For example, not all draw program tools produce objects with Bezier control points, and not all programs include a template layer. Draw programs can't blend from one object to another and not all can do font conversions. They also do not output reliably at resolutions higher than 300 dpi.

Draw programs have been used most often for technical illustration jobs, particularly in black and white, though the new versions now support color ❻.

MACDRAW PRO 1 (CLARIS) MacDraw was the first object-oriented draw program for the Mac. Today its successor, MacDraw Pro, includes a word processor with a spell checker so the application can double as a page layout program. A Bezigon tool creates its shapes with Bezier points, but the freehand tool does not generate Bezier points.

MacDraw Pro can also import MacPaint, TIFF or EPS images, though it can't edit the individual parts of an EPS file. MacDraw can produce linear, radial or shapeburst gradients, but cannot blend from one object to another. It can align and space objects, rotate, scale and flip, but not skew. A DrawOver

3

3 PostScript drawing programs are especially well-suited to technical product illustration because the graphics can be updated along with the products. Wilbert Cruz, of MicroColor, Inc. in New York City, used Illustrator 3.0 to create this cut-away illustration of a computer. He used a scan of a traditionally rendered drawing as a starting point and built up the computer graphic from many overlapped shapes filled with color gradations. New elements can easily be added as the computer is upgraded; and use of a process color palette makes it possible to achieve consistency of color across a wide range of related illustrations.

4

4 Don Baker, a Seattle-based illustrator, has developed a style of flat, brightly colored art that's well suited to the PostScript medium. He recently used FreeHand 3.0 to create the cover art for a compact disk package. First, he made a tight pencil sketch for client approval, then scanned it for use as a template. The final drawing is constructed of many overlapping shapes filled with process colors. A few of the detail shapes, for example, those on the pants and shirt of the harpist, are filled with gradations to create a sense of volume.

utility that comes with Adobe Illustrator can be used to convert MacDraw documents to Illustrator format for further editing.

CANVAS 3 (DENEBA) Canvas is a sophisticated color draw program for the Mac that is especially good for engineering and technical illustration *Tip: Some service bureaus report, however, that it has more output problems than Illustrator or FreeHand.* Its freehand and Bezier curve tools both produce lines and curves with Bezier points, and it can convert type to font outlines. Canvas works in 32-bit color, includes a Pantone library, generates color gradations, and also prints color separations. Its type controls include kerning, tracking, tabs, binding text to curves or objects, spell checking, and wrapping text around or within shapes. Canvas includes an autotrace function, and it can edit the contrast and brightness of imported bitmaps. A SmartMouse feature helps with precision alignment of objects, and an automatic dimensioning feature will measure all or part of any drawing, like a product illustration, for example, and will automatically draw dimension and leader lines, labeled with your choice of arrowheads and numeral styles. Though Canvas is considered to be primarily a drawing program, it also contains a paint layer. (For other applications with both paint and draw capabilities, see "Combined Programs," which follows.)

BITMAPPED PROGRAMS

Programs fall into two main categories—painting and image-editing—though there is a lot of overlap between the two areas. Image-editing programs like Photoshop, Digital Darkroom, ColorStudio and PhotoStyler are designed specifically for the editing and manipulating of scanned images. These are, in effect, desktop versions of the high-end scanning and editing equipment (like Scitex systems) that separators and printers have used for years. Image-editing applications can be used to

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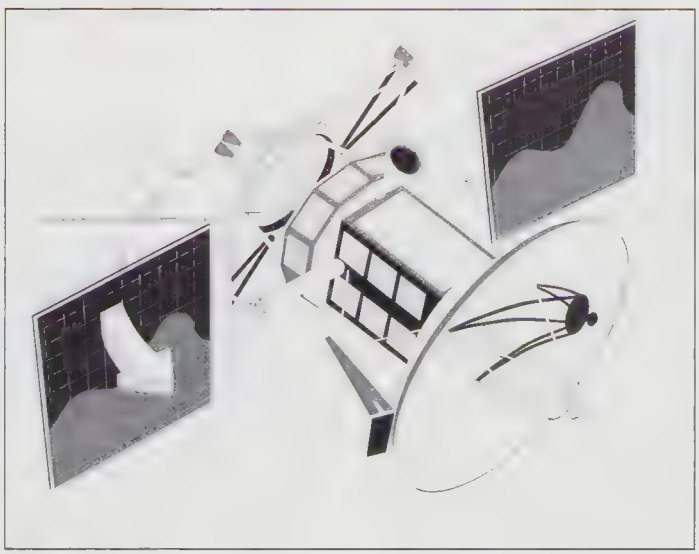


5 With a variety of brushes and an unlimited palette of colors, paint programs can be used to create illustrations with the same richness of tone and texture as traditional media. David Burwinkel, of Bridgeville, Penn., used PixelPaint Pro to create Pipe Dreams, one of a series of works on environmental themes. He blocked in the basic forms and colors with the polygon tool, then used the charcoal and pastel brushes to add detail.

6 The clean lines and geometrical shapes produced by object-oriented programs make them good choices for technical illustration. Bill Baker, art director for the Washington, D.C.-based Knight-Ridder/Tribune News Graphics Network, used MacDraw II to create this drawing of the Magellan space probe. Baker often uses scanned drawings as a starting point for his infographics and constructs objects out of a multitude of polygons colored in different shades of gray and layered over each other.

enhance and control the brightness, contrast, focus and color balance of images or selected parts of them. But their color palettes, painting tools and filters can also be used to create original images from scratch.

Paint programs, like PixelPaint and Studio 8, are intended for use in producing original art, but they can also be used to edit scanned images. Two of the newest paint programs, Oasis and Painter, are designed specifically to emulate the appearance of traditional media. And like image-editing programs, paint programs are designed for use with pressure-sensitive tools.

PAINT PROGRAMS Most paint programs build on the tool palette created for MacPaint, starting with the basics—the brush, pencil, paint bucket, eraser, line, circle and rectangle tools—and add specialty brushes and features. Other features include:

- Ready-made or user-defined color palettes defined by a number of color models, including CMYK, RGB and HSV. Many include standard color libraries;
- Painting tools for painting stroke by stroke;
- Tools for drawing geometrical shapes automatically;
- Tools for roughly or precisely selecting portions of an image;
- Control of the transparency of the paint or of an image that's been pasted into an illustration from another source;
- Masking functions so that portions of an image can be protected from changes applied to nearby areas;
- Filters to quickly add effects and textures.

PIXELPAINT PRO 2 (SUPERMAC) PixelPaint Professional (for the Mac) provides a full range of tools, palettes, filters, masking and transparency features to create virtually any illustration as well as edit scanned images. A variety of filters called Special Effects can be applied to specific tools or used to edit an entire image or selected portion. Examples include diffuse, mosaic, emboss, oil and posterize. PixelPaint's selection of 18 preset but editable pop-out color palettes makes it easy to jump in and get started. PixelPaint Pro does not include a draw layer and cannot import PostScript images except by converting them to bitmaps. However, it can render PostScript type with anti-aliasing. PixelPaint Pro supports both 8-bit and 24/32-bit color ❺. *Tip: Twenty-four and 32-bit color have become the standards for adequately displaying and manipulating digital color images.*

STUDIO 8/32 (ELECTRONIC ARTS) Studio 8 2.0 is a professional painting program for the Mac with a full range of tools and features, but it is limited to 8-bit color. Some special features include a nudge function for moving selections one pixel at a time in any direction, and a perspective function that lets you dis-

tort a graphic so that it appears to be receding toward a vanishing point.

Studio 32, a separate program, is essentially a 32-bit upgrade to Studio 8. It features brushes with automatic antialiasing, plus a separate text layer for creating, editing and printing PostScript type ❼.

LUMENA (TIME ARTS) Lumena, for the IBM-PC and compatible, is a full-featured paint and image-processing program that includes a pressure-sensitive "artist brush." This tool can be used to mimic the look of traditional media, as well as for the creation of custom brushes. Object-oriented tools make it possible to create, edit, copy and transform geometrical shapes. In addition, Lumena can import images from videotape or live video and can be used to create 2-D video animation. Sophisticated masking functions make it possible to use a full-color

A LOOK AT 3-D APPLICATIONS

Capabilities and costs vary widely among three-dimensional software programs. And as you can see here, so do the images that artists are creating with them. Here's how 3-D artists are using some of these software packages. (For cost information on these and all other electronic tools mentioned in this section, turn to "Electronic Resources.") *—Sidebar by Jack Davis*

SWIVEL 3D PROFESSIONAL

Swivel 3D Professional (Mac, MacroMind/Paracomp) operates with a highly intuitive interface and a simple but very powerful modeler (the program functions that create 3-D forms from 2-D drawings). Among its outstanding features are its object-linking prowess, which allows you to build an arm, for example, of objects and joints and then reposition the entire arm by manipulating the shoulder. The new utility Swivelizer, allows for the importing of Type 1 fonts and DXF files. Despite its limited options for rendering, which for some constitute a major drawback, there are still some tricks you can employ to render images in seconds rather than hours. And its new package, SwivelMan (a Swivel Pro/MacRenderMan combination program), does address the rendering limitation somewhat. If you tend to rely on 3-D programs for visualization and multimedia animation rather than for illustration for print, then Swivel may be all the quality you will ever need.

To create the image shown above using Swivel 3D Professional, Presto Studios of San Diego, Calif., created the hierarchically linked model first, then motion-tested it in preparation for importing the Swivel file into MacroMind 3D for use in a CD-ROM-based game called the "Journeyman Project." The 640 x 480-pixel image was rendered in 30 seconds and was antialiased in JAG, a stand-alone utility from Ray Dream, which antialiases the image after, not during, rendering.

INFINI-D

This all-in-one 3-D modeling, animation and rendering application from Specular International (for the Macintosh) is the next logical step up from a program like Swivel 3-D. It uses independent key frames for each object of an animation, and can "morph" (create an apparent metamorphosis) between any two objects—no matter what the shape, color or material of each object. Its robust material editor and its ability to apply multiple texture, bump and transparency maps to a given object are very impressive; they can be especially useful for package design. Ray tracing is slow, but it allows for special effects like animating reflecting ripples in water, for instance.

In the promo piece shown in the previous column, created for Toledo, Ohio-based Artbytes, 3-D artist Steve Mockensturm rendered 65 different lathed or extruded objects to form the guitar. A total of eight texture maps and six mathematically generated surfaces were used to gain this level of realism.

LIGHTWAVE 3-D

LightWave 3-D, (an Amiga program by NewTek), arrives bundled along with the Video Toaster; it can be integrated into a Mac system. It offers everything from complex ray-tracing to motion-blurred particle animation and beautifully clean still images. LightWave is just one part of the complete Video Toaster package, which also includes paintbox-like capabilities for producing broadcast-quality video.

The image above was created by musician Todd Rundgren for his video, "Change Myself." Rendered in LightWave 3D, this frame's video was texture-mapped onto moving objects.

SHOWPLACE/MACRENDERMAN

RenderMan, and MacRenderMan (its Mac counterpart) are to 3-D "scene description" today what PostScript is to 2-D "page description." Showplace (for the Macintosh) is Pixar's

image as a pattern for a mask.

OASIS 1 (TIME ARTS) Oasis is a 32-bit color Mac paint program dedicated to reproducing the look of traditional artists' media. A "lightbox" feature makes it possible to paint over an imported image by actually positioning one document window over another. The lightbox document can be rendered semi-transparent by any percentage amount and by tracing over the image beneath, the parts you have touched are brought up into the overlying document.

Version 1.1 of Oasis will be shipped free to all registered owners and will remedy some of the deficiencies of version 1.0. For example, it will allow user-defined resolutions and includes a zoom function ❽.

PAINTER 1.0 (FRACTAL DESIGN) Available for the Mac and PC, Painter is also dedicated to reproducing the look of traditional media, and, among others, has

front-end for RenderMan's extremely high-quality rendering engine. (RenderMan is the software behind the Academy Award-winning animation, "Tin Toy"). Showplace, without any modeling or animating capabilities, simply and elegantly allows the artist to set up a scene by bringing in models, assigning them material attributes, called Shaders, and then lighting the objects for a pixel-perfect still illustration.

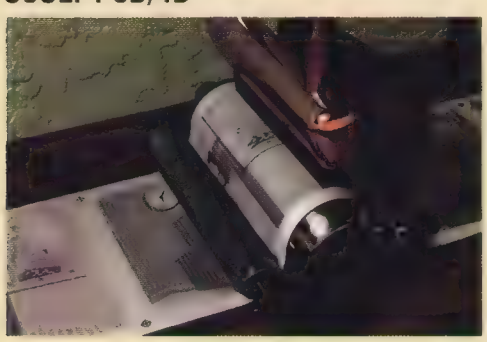
The scene shown on the opposite page, below, was created by Pixar and composed in Showplace/MacRenderMan, where the texture maps on the cards and the table were applied and the lighting was arranged. For the final rendering, the file was sent to MacRenderMan for a subtle custom "Shader" of the finish of the felt table.

MACROMIND THREE-D

One of the nicest things about Three-D from MacroMind/Paracomp (for the Macintosh) is that its animation interface has a lot in common with its 2-D cousin—MacroMind Director. That, along with the new partnership with 3-D veteran Paracomp, makers of Swivel 3D Pro, makes it easy and seamless to model in Swivel Pro and then choreograph and render in MacroMind Three-D. In addition to Three-D's own fairly sophisticated Phong shading (with soft-edged shadows also), it has some of the best links to high-end rendering through MacRenderMan.

Presto Studios created the image shown above in MacroMind Three-D for a CD-ROM-based game the company is authoring. To save time, this scene was rendered as four different layers, and later composited using alpha channels in Photoshop.

SCULPT 3D/4D



Sculpt 3D (for the Macintosh), from Byte-By-Byte Corporation, has an excellent modeler and one of the best renderers among all three-dimensional applications. With the addition of its Sculpt 4D package—which adds perhaps the best organic character animation capabilities now available on the Mac—you can create everything from high-end product design to 3-D cartoons. So what's the catch? Well, the latest incarnation still has one of the most complex interfaces to master of any 3-D program. But even so, many of the top 3-D designers report that they are moving over to Sculpt 3D to get the quality they need.

Created by artist Reed McCullough of Austin, Texas, using Sculpt 4D, the scene shown at the bottom of the previous column is part of an animation featuring a fictitious inkjet printer in operation. Using seven different custom texture maps, the artist moved the maps themselves, and not the model, over the roller, thus simulating the application of the ink and the motion of the paper through the press.

RAY DREAM DESIGNER

In this Mac application, Ray Dream developers have focused on high-resolution still images, rather than on animation capabilities (although the very latest version lets you work with the Swivel 3D animation files). Its spline-based drawing and extrusion-along-a-path capabilities make it a very powerful, yet simple-to-use modeler. *Tip: Akin to Bezier curves in Illustrator, FreeHand or Corel Draw, splines can create smooth, curved surfaces.* Ray Dream Designer's primary rendering method is ray tracing. In fact, it is the fastest of all ray tracing programs with the help of its stand-alone utility, JAG, which allows images from Ray Dream Designer (and any other programs that create PICT files) to be antialiased after the image has been rendered, rather than during rendering.

Designer/illustrator Dan Marcolina, of Conshohocken, Pa., created the robots shown above by starting with five basic parts—the head, the body, the two legs and the surface. Once he had assigned color, reflection and shadows to those parts, he brought them into Ray Dream Designer's scene builder, where he made one robot and then duplicated it as many times as he needed for the others. The image took approximately seven hours to render, with final touches in Photoshop, including feathering edges to make the robots look like they were glowing.

(Continued on page 118)

two special artist brushes that actually imitate the painting styles of Van Gogh and Seurat. (For more on Painter, see "Natural Media on the Desktop," in this issue.)

IMAGE-EDITING PROGRAMS Programs for image-editing provide tools of two basic types: Those used to alter the graymap or color levels of a scanned image or a selected portion of it (its brightness, contrast, color balance, and so on), and those used for retouching and combining photos. Most programs include custom brushes, masking, transformation tools (scale, rotate, stretch, distort, slant, perspective), filters for special effects (blur, sharpen, trace edges, and so on), measurement tools like rulers and crosshairs for precise location of elements, and multiple open documents, so that you can easily select, copy and paste between images. All include a rubber stamp function for cloning parts of an image and painting with it. This could be used, for example, to pick up clouds from one portion of a scanned sky and paint copies of them into another part.

In addition to image-editing, these programs can be used for painting original images, using the special effects of brushes and other tools as you would in an advanced paint program.

(Continued from page 117)

SKETCH!

This application, developed by Alias Research, a longtime leader in the high-end broadcast animation field, had a difficult beginning, but should be available again by the time you read this. Sketch!, now geared specifically to illustrators and designers, does not include any animation capabilities, but boasts the most "free-form" modeler of any 3-D program available at the time of this writing. You can literally draw in all three dimensions at once, and any point on its spline curves can be moved to readjust a 3-D shape. The program's "perspective matching" also allows you to render a 3-D model into the perspective of an imported background photo, even casting realistic shadows onto the photographic background.

The perspective-matching feature of Sketch allowed artists at Alias Research to match the perspective of an existing image and replicate the lighting of the original scene (shown above). By using the Match Backdrop command, the coffee set was situated realistically in the imported image, then rendered to combine the Sketch geometry and the original image.

STRATAVISION 3D

Suffice it to say that StrataVision 3D (for the Mac, by Strata) is still the longest-lived and most popular photorealistic 3-D illustration program for the platform. Artists report that it features an intuitive, draw-like modeler with some of the best rendering available—including its unique "Raydiosity," enhanced ray tracing capability.

Though StrataVision is known for its photorealistic simulation, it also allows for some interesting tricks. In the illustration at the bottom of the previous column, JHDavis Design, San Diego, Calif., simply imported a grayscale image of the letters AGDA (Australian Graphic Design Association) that had already been manipulated in Photoshop. StrataVision automatically extruded the image (whites being the high points and blacks the low) into the mountain model.

3D STUDIO

This PC application (from Autodesk Inc.) is a leader in today's hot 3-D "price versus performance" competition. The program's spline-based modeler, renderer, materials editor and keyframer are all integrated with a single, easy-to-use interface. Artists creating flying logos, industrial visualization or business presentations find it very useful.

The image above was created by Tim Forcade of Forcade & Associates, Lawrence, Kan., in Autodesk's 3D Studio. The images on the crayon were created in Chaos (Autodesk) and the color palette refined in Animator Pro before the image was texture-mapped into 3D Studio. A transparent bump map was applied to the violet crayon (lower right) to create a texture. Using a Howtek Scanmaster and Scan-It, actual crayon scribbles were scanned in for use as a mask on different colors.

TOPAS/MacTOPAS

A professional, broadcast-level package that is very popular on the PC, TOPAS (developed by AT&T Graphics Software Labs) has been rewritten for the Macintosh. TOPAS

Grayscale image-editing programs like Digital Darkroom and ImageStudio work only with grayscale images. Color image-editing programs can edit color (8- and 24/32-bit) and grayscale images. They also expand on the tools offered by the lower-end programs to include a variety of sophisticated filters.

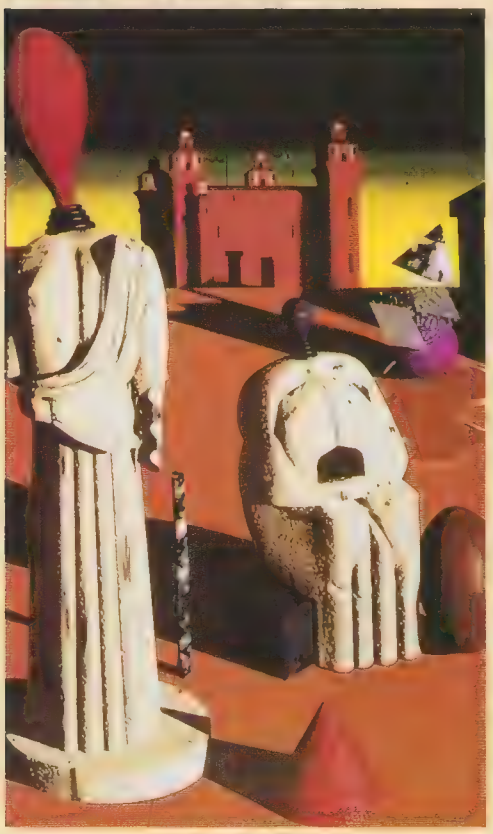
IMAGESTUDIO (LETRASET) ImageStudio's tools make it especially effective as a stand-alone Mac painting program, though it's designed primarily for grayscale image-editing. The water drop, fingertip and charcoal tools can be used to blend and blur the edges of images so that photo montages are more seamlessly joined, or to create painterly effects in original graphics. ImageStudio also allows the creation of custom tools.

DIGITAL DARKROOM (ALDUS) Although Digital Darkroom 2.0 is designed to work only with black-and-white and grayscale scanned images, you can add color overlays as tints or solids. Colored images can then be saved as 24-bit TIFFs (tagged image file format) and placed in a page layout program for color separation. In addition, Digital Darkroom features some masking functions and an autotrace function which can convert all or selected parts of a grayscale image to line art and export the

and MacTOPAS are complete packages featuring strong spline-based modeling. The program also features a key frame animator and a high-resolution Phong renderer. The application makes it quite convenient if you need to work on the same project on both Mac and PC platforms.

The prototype package design shown at the bottom of the previous column, illustrated by Thach Nguyen, of Washington, D.C., was created from blueprints supplied by the client, after which different color schemes and logo treatments were quickly explored and refined using TOPAS. This image took about half an hour to render on a 386 IBM PC–compatible computer.

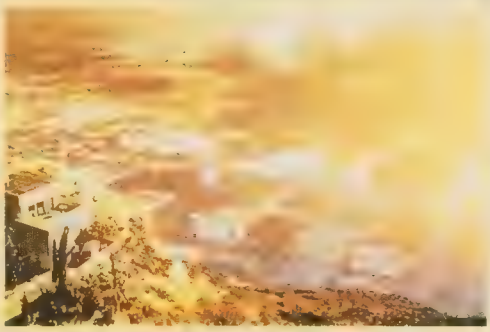
PRESENTER PROFESSIONAL



Yet another all-in-one package, Presenter Professional (for the Mac) from VIDI, shines in its "digital clay" spline-based modeling abilities. This type of object rendering is ideal for product design or organic illustration. Due to the structure of these models, plus a strong Shader selection interface, this program also provides some of the best support for exporting files to MacRenderMan.

The statues of artist Tim Clark of Mid-West Litho Arts 3-D Imaging Center, Des Plaines, Ill. (shown above), demonstrate the powerful spline-based modeling capabilities of Presenter Professional for describing free-form objects. The curves and dents were created by "loafing" cross-sections and then pushing and pulling the individual surfaces of the "digital clay."

ELECTRIC IMAGE ANIMATION SYSTEM (EIAS)



This Macintosh program (from Electric Image) makes up for its lack of modeling capabilities with its incredible speed and the unusually high rendering quality of its Phong shading, which almost rivals the typically higher-quality raytracing of some other programs. *Tip: Rendering is the process of turning a 3-D structure into a finished, solid-looking object with surface characteristics and lighting effects.* In addition, it can import almost any 3-D format, including models from Enabling Technologies' now defunct "Zing." With its utility "Mr. Font," EIAS also does a great job of creating beveled type from any Type 1 font. If you're looking to make money in animation, this is the program that will quickly get you up to speed creating practical, real-world jobs on-time, on-budget.

For instance, the destruction of Los Angeles pictured in the scene above from the movie "Terminator 2," was created by 4 Ward Productions, Hollywood, Calif., with 3-D animation generated in the Electric Image Animation System. Fracturing the polygons of the computer model and compositing them over live-action film made the city appear to disintegrate.

Jack Davis is principal of San Diego-based JHDavis Design, an interactive media, animation and design firm. In addition, Davis is graphics editor for Verbum *and the art director for Verbum Interactive, the first interactive, multimedia CD-ROM publication. He has been a contributing author/illustrator for seven books on computer graphics and is presently finishing work on his latest, "The Photoshop WOW! Book."*

7 Sometimes a combination of programs works best for getting the effects you want. Mark Jasin, an illustrator based in Los Angeles, used Photoshop to convert a scanned color photo of a bulldog into a coarse 72 dpi bitmap TIFF. He then used Studio 32 in its 8-bit color mode to paint over the dog with colored shapes and dithered gradations. He re-imported the TIFF and placed it over the color area to restore the image of the dog. Because the white areas of the bitmap are actually transparent, the color underneath shows through. He then used a speckled airbrush and smear brush to add detail strokes.

8 Image-editing programs can be used simply to correct color and touch up blemishes on scanned photos, or to cut and paste together photo images of things that never existed. For an illustration in *The San Francisco Chronicle*, Lance Jackson, a Berkeley, Calif.-based illustrator, used Photoshop to construct a collage of Elvis, then used Oasis to add textures.

lines in Illustrator 1.1 format for further editing.

COLORSTUDIO 1 (FRACTAL DESIGN) ColorStudio with Shapes is a sophisticated Mac-based color image-editing program with all the capabilities of a basic paint program, plus the special tools needed for the manipulation of scanned images. Its virtual memory system allows handling of large or high-resolution images and it supports scanning directly to the program. A color mixing palette lets you create colors by smudging them like you would with real paint.

ColorStudio's Shapes annex is a drawing supplement that provides a PostScript layer that floats above the bitmapped image. Shapes offers tools for developing PostScript type, and objects and graphics created in other PostScript programs can be imported. PostScript objects can be arranged and re-arranged over the paint image until the design is finished, then rendered into the bitmap with anti-aliasing at the resolution of the underlying image. The Shapes layer can also be printed independently at any resolution ❾.

PHOTOSHOP 2.0 (ADOBE) Photoshop is a powerful and versatile Mac program for color image-editing and painting, with sophisticated tools and functions that provide a virtually endless range of possibilities for manipulation of images. And because Photoshop can import and export images in most computer file formats, it has become an invaluable aid for transferring images between applications. Some effects that can be created in Photoshop include soft shadows behind objects or text, screening of text out of a graphic image, blurring to create an effect of motion, using grayscale information to produce embossed designs, and creating custom palettes of brush shapes for painting. Photoshop includes a pen tool like Illustrator's which can be used to draw PostScript paths. These paths can be saved and used as selection outlines and can also be exported to Illustrator for use as clipping paths. (For Photoshop "how-tos," see the next article, as well as several others in this guide.)

PHOTOSTYLER 1 (ALDUS) PhotoStyler is a new 24-bit color image-editing program for the PC. Based on Windows 3.0 software, it includes all the usual image-editing features, plus a scratch-pad area which can be used to test colors and effects in preview mode, before applying them to an entire image. In addition to built-in filters like Ripple, Pinch and Sphere, it's possible to define and save any number of custom filters for enhancing or distorting images. An "Expand" selection feature makes it possible to select parts of an image that are similar to the color or gray value of the current selection ❿.

ALDUS GALLERY EFFECTS Aldus Gallery Effects is a group of plug-in filters which can be used to modify color or grayscale images on the Mac so they take on the appearance of traditional media. (See "Painterly Facelifts for Frame Grabs," in this issue.)

COMBINED PROGRAMS

Combining some of the best features of both painting and drawing, programs like SuperPaint and UltraPaint provide a paint layer and a draw layer that are superimposed on-screen and in printouts. The draftsmanlike

drawing tools can be used to create precise shapes, which can then be transferred to the paint layer to add color and texture. Conversely, elements created in the paint layer can be transferred to the draw layer for precise positioning. For the less experienced illustrator, or for one with a limited budget, combination programs can provide an all-purpose graphics environment.

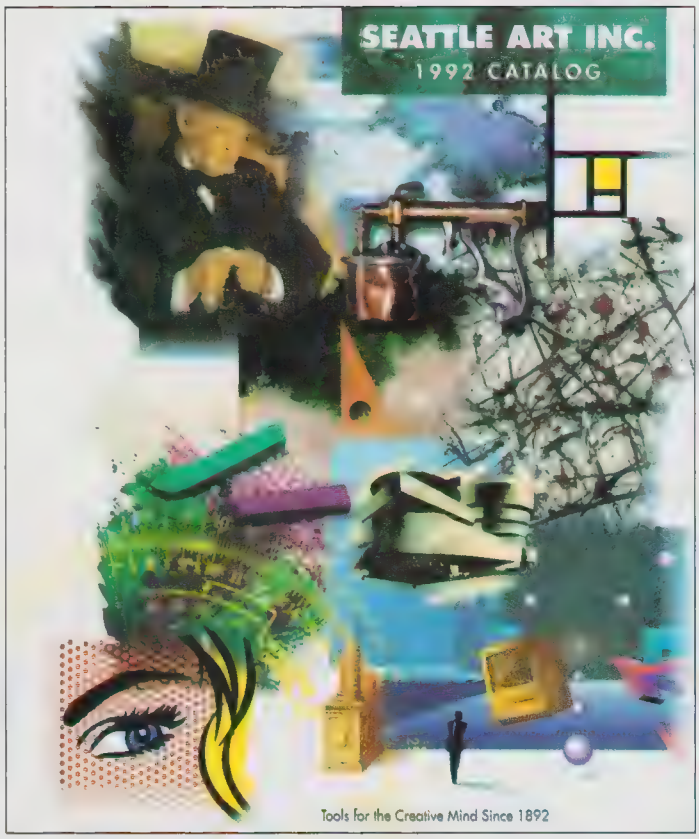
SUPERPAINT 3 (ALDUS) The new SuperPaint 3.0 is billed as a painting, drawing and image-enhancement program, and indeed, this Mac-based program can perform all three functions. The basic tools common to both paint and draw programs are included, as well as a masking function and tools for editing the contrast, brightness and color balance of scanned images. A SuperBits feature makes it possible to increase the resolution of bitmapped objects and place them in the draw layer for output at high resolutions. The draw layer also includes a freehand tool for drawing Bezier curves. SuperPaint also includes plug-in tools like those found in image-editing programs, including a smudge tool, calligraphy brush, dry brush, charcoal and texture brush.

ULTRAPAINT 1 (DENEBA) UltraPaint, like SuperPaint, includes a paint and draw layer and editing of grayscale scans. Bezier paths can be rendered with a freeform tool or a point-by-point pen tool. The basic transformational tools are included in this Mac program (rotate, flip, invert, skew, distort, stretch), as well as a perspective feature for distorting objects.

In addition to its basic tools, UltraPaint includes a selection of "external" add-ons—plug-in features including a fingertip smudge tool, magic wand and water droplet, and autotrace and masking functions. ■

Janet Ashford is a professional graphic designer and writer, based in Solana Beach, Calif. She is a regular contributor to Step-By-Step Electronic Design.

9



10

9 Image-editing programs make it possible to combine images created in different ways. For an art store catalog cover, Jeff Brice, a Seattle-based illustrator, used ColorStudio to create and combine elements that depict the history of art movements during the last 100 years, including a scan of a Degas painting, a bogus Lichtenstein-style comic book painting created in FreeHand, a "Mondrian" and a "Jackson Pollack" created in ColorStudio, an altered scan of the Guggenheim Museum, and a futuristic design created in FreeHand by Studio MD, Seattle.

10 A working illustrator, fine artist and experienced PhotoStyler user, Michael Johnson was commissioned by Bantam Books to create the cover of a forthcoming book on PhotoStyler. Art director Amy King furnished him with a color comp of a butterfly and globe floating over a desert, along with the images on a Syquest cartridge. First, Johnson resized the 41 mb background to a reasonable working size of 18 mb. (The butterfly was downsized from 7 mb to 2 mb.) Next, he did some clean-up work, removed backgrounds where necessary, sized elements, rotated them and pasted them into the background. "I found it easier to paste them in and immediately see them in relationship to one another, rather than make masks and see marching ants all over my screen." With the main elements positioned, he scanned in all the other elements (except the type) from "The Complete Encyclopedia of Illustration" book. After resizing and further edits using masks and gradient fills—the Madonna/child were set at a 60 percent transparency—he created the script type in Corel Draw 2.01 (at 300 dpi like all the other images) and imported it into PhotoStyler where he created a mask and filled it with white. Since this image was ultimately not used by Bantam, Johnson used it as a Christmas mailing. He saved the file as a .TGA (Targa) and took it to Harvest Productions, an Anaheim, Calif.-based service bureau for artists who print on fine arts paper and canvas. Harvest printed the image with the Iris color printer on Rives printmaking paper.

Photorealism Without Scans

With photographs taped onto his monitor for reference, Bert Monroy shows how to create realistic patterns, perspective, and neon glow, among other effects.

By Bert Monroy

Imagine putting down your wet brush to cut a mask for some airbrushing. Then you turn on the compressor, fill your cup with paint and begin to work. When you're finished, you remove the mask and start using your pencil to touch up. Finally, you go back to painting and pick up the brush again. But in the time it took to do all those other steps, the brush has already dried up. And of course, the airbrush is now clogged because you didn't clean it after using it. Frustrating, isn't it?

Artists who are now painting on the computer will quickly point out that with today's paint and image processing programs, you can switch from one tool to another—one color to another, one effect to another—in a snap, without ever having to clean up afterward. Even during the early concepting stage, consider how quickly you can sketch elements and then manipulate and arrange them in any manner your imagination may conjure up. The entire colorization of a landscape can be changed in a few quick, easy steps.

If you work traditionally, you are aware of how many good alternatives you simply never explore due to time or budgetary constraints. But when you are painting with pixels, you can save an image at different stages of a project, so you can explore a variety of new directions. Another major advantage is the computer's forgiving nature. Features like "Undo" and "Revert" quickly eliminate many "oops" for every user.

So follow along in this easy painting tutorial using Adobe Photoshop. You might just be persuaded to add a mouse or stylus to your toolbox.

Because of its reputation as a sophisticated color-retouching, image manipulation and prepress application, Adobe Photoshop is often overlooked as a "straight" paint program. But after you experiment with it, you will find that the tools operate much in the same fashion as traditional illustration tools, with one significant difference: You look up at a screen instead of down at your hand.

The image featured in this tutorial is a good example of an image created entirely with the computer. I took my own reference photos and simply taped them to my monitor. I then drew freehand with the mouse right on the screen. Some traditional illustrators sitting down at the computer for the first time complain that the mouse feels awkward, but I feel comfortable with it. My introduction to the Macintosh was back in 1984, when the mouse was its only cursor control. Now there are many mouse replacements. One such device is the pressure-sensitive Wacom tablet, which I use when a project calls for a flowing stroke. For example, the tablet is perfect for graffiti in my street scenes. (Turn to "Artists Put the Pressure On," in this guide for more on how other artists are using these tools.)

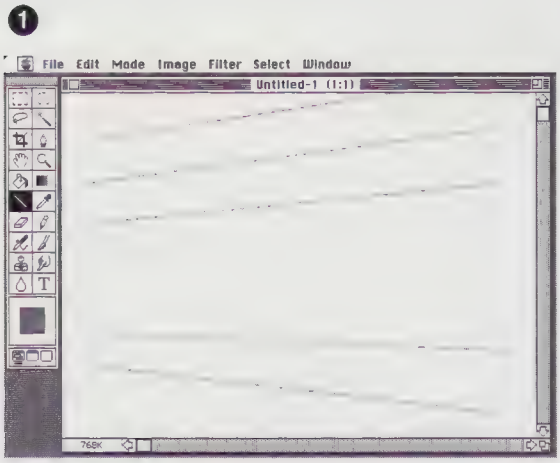
Because the "Peter's Ice Cream Cafe" illustration shown opposite took close to 30 hours to create, it would consume this entire issue if I were to explain in detail all of the effects. Instead, I will simply focus on the creation of the sign, and the textures and surfaces. In this way, you will learn methods for using the line tool, the magic wand, eraser, blend, pen and rectangle selection tools. You will also understand how to create fill patterns and simulate perspective with the Distort command.

Once you master these simple methods, they can be applied to a multitude of effects, not just the ones you see here. But, in general, the best way to learn any program is to play with it. Push the buttons; you can't hurt the program.

And when you are finished working on screen, you don't have to clean up!

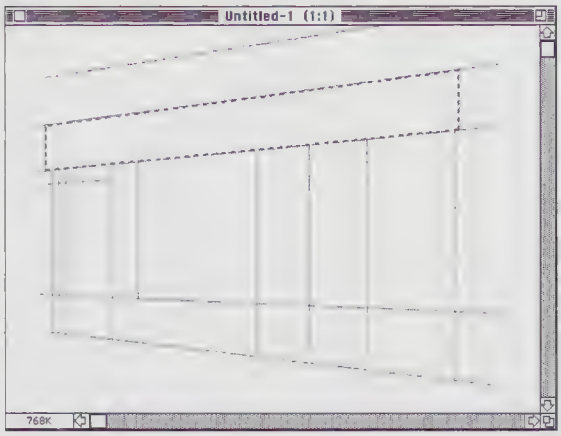
Peter's Ice Cream Cafe This 13 mb image, illustrated by the article's author, Bert Monroy, was created from sketch to final on his Macintosh IIfx in about 30 hours. From brick patterns to type, all the work was done in Photoshop without the aid of scanned or imported files. For example, the sign's type was keyboarded right onto the image using Photoshop's text tool in preparation for colorization. But if your own project requires a lot of clean-edged type, create it first in a page layout or PostScript illustration program. *Tip: Text files must be saved as EPS files before being imported into Photoshop.* If you do create the type in Photoshop, it is advisable to work at higher resolutions, making the pixels small enough to be undetectable. Text appears as a selected object, and in the case of the checkerboard you see here, you can use the Distort command for more interesting perspectives.

CAFE
ICE CREAM
PETER'S ICE CREAM CAFÉ
THE HOME OF CHOCOLATE DECADENCE
CHOCOLATES
ICE CREAM CAKES
Bert Monroy '91



1 First, I took my own photographs of the street scene for reference. These photos were not scanned, but were taped to the side of the monitor the same way a traditional artist would tape them to the side of the canvas. Next, using the line tool, I drew perspective lines. The proper use of perspective is vital for achieving realism in a scene. I do, at times, exaggerate the perspective, all by eye, to give the image more dimensionality.

2 To these lines, vertical lines were added to depict doorways, windows and other details. The intersection of these lines constructs closed shapes, which are easy to select in order to separate them from the rest of the image the same way a frisket or mask would on canvas. (This selection process will be covered in detail in later figures.)



3 When you select an area, it is segregated from the rest of the image. It acts as a mask, allowing you to perform any function within that area while protecting the rest of the image. Using the magic wand selection tool, the sign was selected by clicking within the area defined by the intersecting lines. The magic wand allows you to select a color or a contiguous area of similar colors by simply clicking on that color. In the Wand dialog box, there is a Tolerance control setting, used to determine how far the selection area will spread (how far the wand will search), with values ranging from 0 to 255. So let's say you have a gradient to select, from black to white. With a high tolerance setting, clicking in the center or the 50 percent gray of the gradient will select most of it. With a Tolerance setting of 1, you will select only the 50 percent gray. My next concern would be choosing colors for the sign.

4 The bottom of Photoshop 2.0's tool palette features background and foreground color selection (see far left). The small box centered within the larger one represents the foreground color. This is the color all the tools will use to lay down their effect. The outer box represents the background or canvas color. This is the color the eraser tool will erase to, or that will be left when an area is selected and then erased by pressing the Delete key. The blend tool, one of the best tools for photorealistic approaches, makes a gradation between the foreground color and the background color. To select a color you simply click in the color box. A dialog box will appear which gives you access to more than 16 million colors, including Pantone and Trumatch palettes.

I selected a dark blue for the foreground of this piece, with a lighter shade of the same blue for the background. Using the blend tool, a gradient was laid down by first clicking within the area to be filled at the point where the foreground color will appear, and then by dragging to the end of the blend. While you do this, a line follows the cursor. The line lets you determine the direction of the blend. Releasing the mouse button will apply the blend from one color to the other. *Tip: In addition to these linear fills, Photoshop*

4 *continued*
provides a radial fill, made from concentric tones, from foreground color out, as in a halo effect. The reflections of objects in the sign were created with the pen tool, which creates selections shaped with Bezier curves. *Tip: Similar to the pen tool in Adobe Illustrator, Photoshop 2.0's pen tool allows you to make precise irregular selections, which can be made into masks. It is the only selection tool with its own menu.* Shapes were created and filled with blends in the same way the sign was done.

5 To create the checkerboard design on the sign, a fill pattern was created. To do this, a new file was opened. The rectangle selection tool was used to make a square shape and black was chosen for the Foreground color. The square was then filled with the black. *Tip: Depressing the Option and Delete keys does a quick fill with the Foreground color of the square selection, thus creating the black box.*

6 With the box still selected and the Option button depressed, a duplicate was dragged to the lower right of the original. Both boxes were then selected with the rectangle tool and Define Pattern was chosen from the Edit menu.

7 Back to the original image, the sign was selected and copied to the clipboard. A new file was opened. Photoshop always creates a new file with all the attributes of the contents of the clipboard. Select All was chosen from the Select menu, as was Fill from the Edit menu. In the Fill dialog box , the Pattern choice was selected. This filled the new file with the pattern of squares.

8 The center of the patterned file was selected with the rectangle selection tool and filled with black. The entire shape was then selected using Select All again (Command–A on the keyboard) and copied to the clipboard.

9 Returning to the main picture file, a paste was executed. Using the Distort command found in the Effects submenu under the Image menu, the imported checkerboard-bordered shape was distorted to fit the angled shape of the sign. When the Distort choice is selected, four white boxes will appear at the corners of the selection. Clicking and dragging these boxes will allow you to control each corner separately to distort the selection.

10 With the imported patterned shape still selected, the Paste Controls from under the Edit menu are brought up. The black of the pattern is eliminated by moving the Floating Selection slider's black triangular handle on the left to the right. This removes the darker values contained in the floating selection which leaves behind only the white checks. Depending on which slider you use, you can eliminate certain values from the selection being pasted in. If the sliders on the underlying image bar are used, the values of the image below the floating selection will not allow any new values to be pasted over them.

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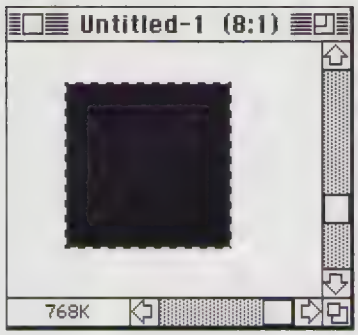

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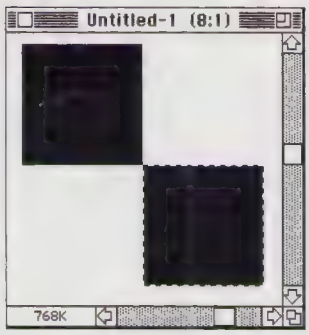

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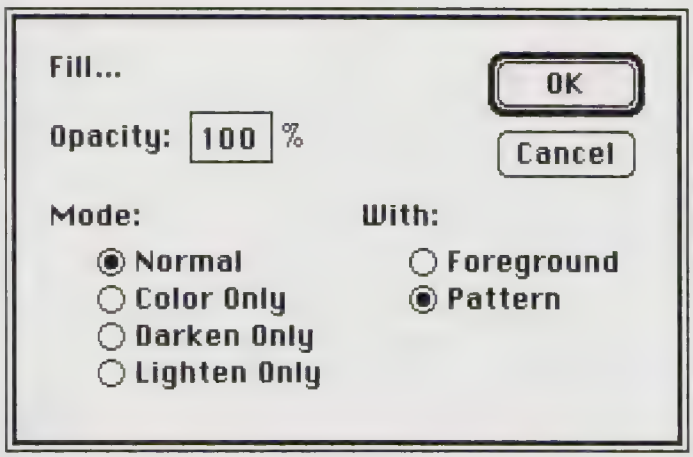

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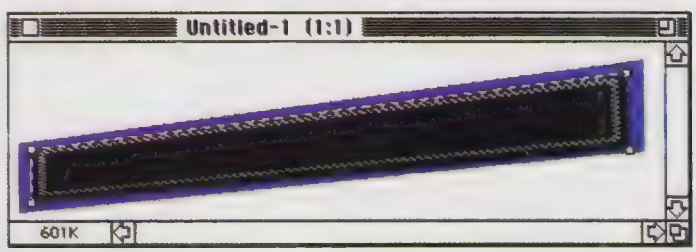

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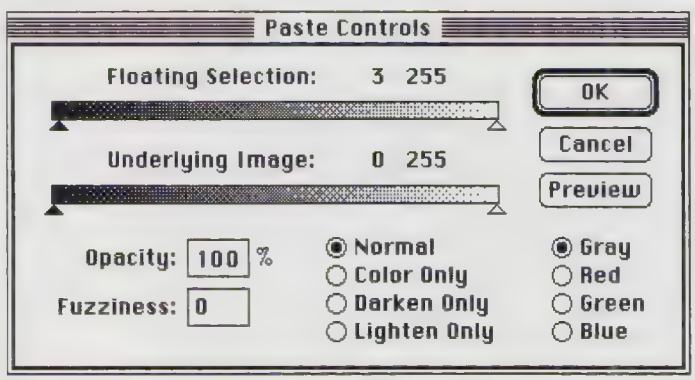

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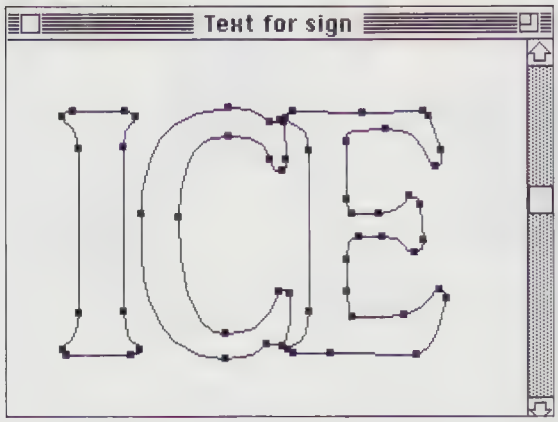

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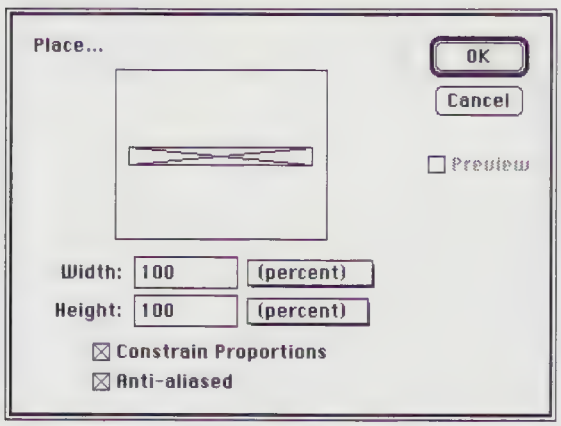

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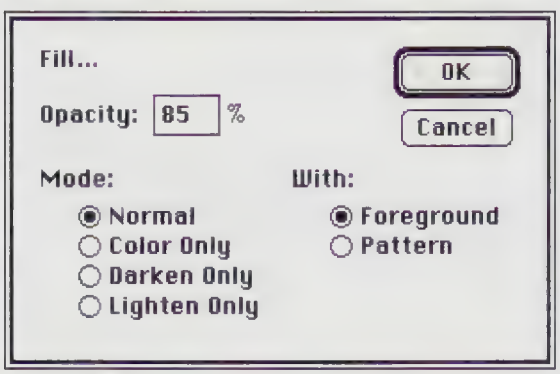

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11 Next, "THE HOME OF CHOCOLATE DECADENCE" was typed with the image file open using Photoshop's text tool. White was selected as the foreground color. The main title was a bit more complicated. First, the type on the actual sign is hand-lettered and stylized, so I decided to create the type in Illustrator 3.0. In Illustrator, the letters were typed in Palatino, a face very similar to the one on the actual sign. Illustrator 3.0 can create the outline of any Type 1 font and turn it into an editable object. And using Adobe Type Manager, the computer looks to the printer font file for the description of the shape of any given typeface to draw it on screen. Illustrator 3.0 looks at that same information and then converts the type into an object. The type, now an object, will have handles at each stroke, allowing you to alter each letter's shape. With this technique, the letter outlines were manipulated to simulate the sign type. Then the file was saved as an EPS file.

12 Returning to the image file of the Ice Cream Café in Photoshop, the Place command under the File menu was activated. *Tip: Photoshop 2.0 has the ability to import EPS files with clean anti-aliased edges which are rasterized to the resolution of the file accepting the imported graphic.* The dialog box (shown here) which pops up, lets you input the desired size of the object being imported in relation to the file accepting it. It also lets you position it where you want. The type appeared over the sign and was then distorted, as the previous items, to conform to the perspective of the sign.

13 The neon signs visible in the window required a different technique. With the paint brush tool, the letters were individually created. Colors were selected as described in Figure 4. Holding down the Shift key allows you to create straight connecting lines from click to click with any of the drawing tools. This provides straighter lines than trying to draw the neon letters (in the usual freehand painting mode). The glow of the neon was created next. Once a word was done, the letters were selected with the magic wand tool. *Tip: Clicking on the strokes of each letter with the Shift key depressed will allow for multiple selection.* Once the entire neon sign was selected, Border was chosen from the Select menu. This selects an area around the edge of the letter rather than the letter itself. The radius is proportional to the size of your particular image—in this case, a radius of 4 was input. This becomes the area of the glow.

14 To soften the edge of the glow, Feather from the Select menu is brought up and 2 is entered. *Tip: When you choose Feather from the Select menu, its dialog box asks for the degree of feathering, in pixel values from 1 to 64. The higher the feather radius number, the softer the edge.* I have found the best result for glow effects is half the Feather to the Border radius. The Feather command serves as a vignette effect to any selected area.

15 In the case of the neon, I wanted to achieve the effect of the glow slowly dissipating. A color for the glow is selected in the Foreground color box and Fill is brought up from the Edit menu. The opacity is lowered to allow some of the background to show through. The percentage of the opacity can vary. Entering different amounts and hitting the Preview button will allow experimentation to achieve the best results.

16 The resulting sign features a true glowing neon effect.

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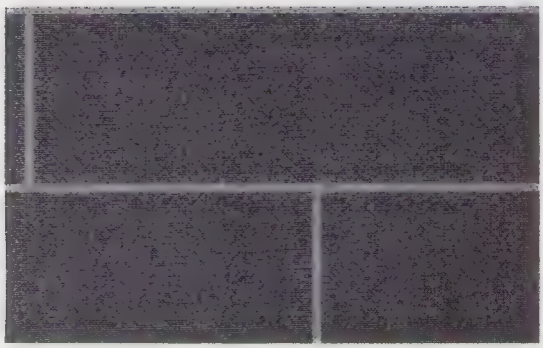

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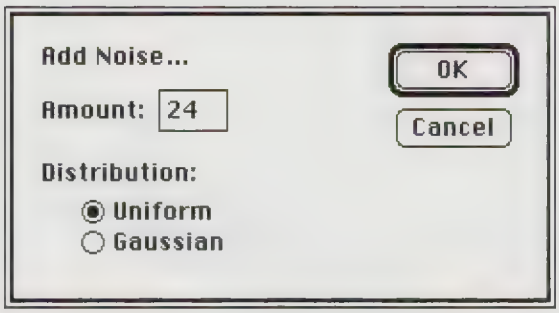

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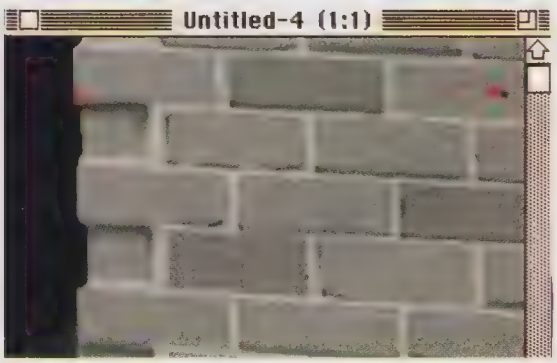

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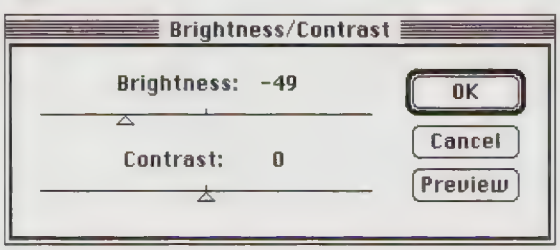


17 The bricks on the walls employed patterns, filters, fills and imagination.

18 The brick pattern for the walls was created in much the same fashion as the checkerboard pattern. The overall color of the bricks was filled into a rectangular selection and then exposed to the Add Noise filter which gave it a texture. The color for the grout was selected, and horizontal and vertical lines were drawn with the line tool to depict the brick shapes. The wall areas were selected and filled with the pattern and distorted, as before, to conform to the perspective. The wall area was easy to select since it had been outlined with the original perspective lines. With the magic wand, I clicked in the area outlined for the wall. Here, however, fine tuning was required. With the airbrush tool and the grout color, the grout lines were roughed up to show wear and tear on the walls.

19 Random bricks were selected and either lightened or darkened to create the effect of real bricks. With the Airbrush and a dark value of the brick color, an edge was sprayed along the bottom of each brick to give added dimension. *Tip: The Airbrush is similar to the Paintbrush, and it lays down gradual tones of color with soft edges. The Airbrush Options window fade-out box, for example, controls how far a stroke will go before it runs out of ink.*

20 The grime stains on the sidewalks and walls were created with the Lasso selection tool. The desired shape on the sidewalk was selected (the grime effect would be added into this shape) and heavily feathered to soften the edges. In this case, a feather of 15 was applied, which spreads the edges far enough to simulate the effects of grime on a typical city sidewalk.

21 The Brightness/Contrast controls were brought up from under the Image menu. This control allows you to lighten and darken an image as well as increase or decrease the contrast between adjoining colors. To utilize these effects, you simply slide the small triangles under each line, to the right to increase or the left to decrease. Values are displayed numerically, and simple adjustments are easily made.

22 Finally, the area was darkened slightly, thus creating the grimy look to the selected area. *Tip: For more control than Brightness/Contrast, try the Levels control.* ■

Bert Monroy, an accomplished illustrator and designer, has worked for 20 years in advertising art. In addition to teaching for DGEF and the School of Visual Arts, he is coauthor with David Biedny of "The Official Adobe Photoshop Handbook" (Bantam Books).

22

Natural Media on the Desktop: Painting with an 'Electronic' Brush

A step-by-step look at how one artist achieves fresh line and gentle washes of color using a 24-bit color paint program that emulates the traditional artist's media.

By Nick Fain

Staunch traditionalists may wonder why in the world they should outfit their studio with an expensive computer system and software that "fakes" the look of paint on canvas, when they already have the real thing. But as more professionals move permanently into electronic studios, they find they need the freedom to quickly choose from a wide variety of desktop-accessible media. And the new genre of "natural media" software—with tools and features that mimic the painting methods of the masters—provides digital illustrators with an

Jazzy Watercolor Three separate Painter files were combined into this final 25 mb image, where touch-up and background work was completed. The file was imported into Photoshop and saved in CMYK mode as a Scitex CT format image for output to negative film for print reproduction.

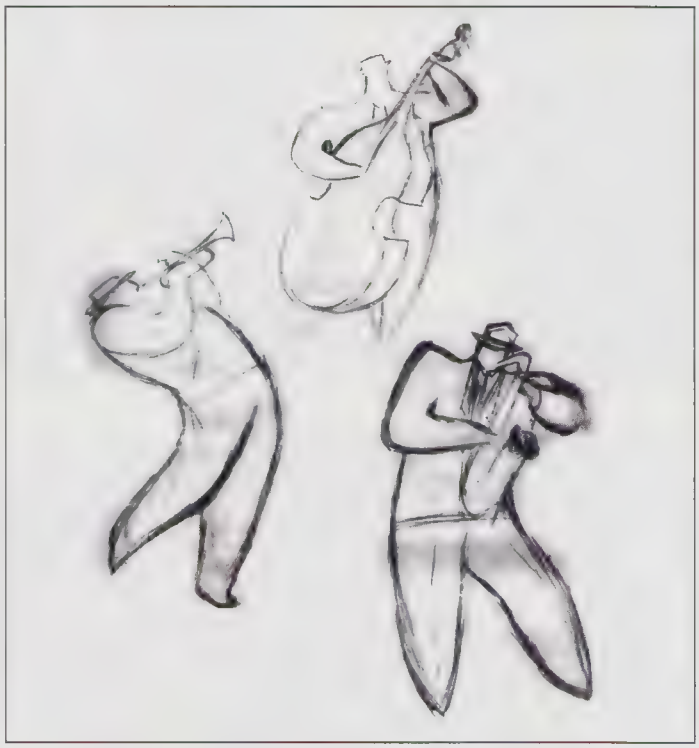
Film imaged directly from Macintosh to Scitex Dolev/PS by Laser Graphics, San Francisco, Calif.

expanded set of brushes, paints and papers.

All it takes is a good understanding of standard Macintosh operation to begin producing professional results with a 24-bit color paint program like Painter, by Fractal Design (developers of ColorStudio).

As a designer and illustrator, I have used a wide variety of paint, 3-D and image-editing programs—as well as my share of traditional paints and papers—but I had never tried Painter before. So in sharing my very first experience with *Step-By-Step* readers, I decided to create a very simple watercolor drawing of some jazz musicians. The purpose of this brief demonstration is solely to show how I achieved spontaneous line and gentle washes of color—not to test the limits of the software, nor to do a software review.

❶



1 To create loose line and gentle washes of color that would emulate traditional watercolor effects, I started out with three loose figure sketches created with pencil on paper. These roughs were scanned individually and saved as Photoshop RGB files (high resolution 300 pixels per inch). By making them separate, smaller files, I could increase speed and efficiency during the painting process. The brushes track more naturally on a smaller file. The completed figures would be copied and pasted into a larger file later, where the background color would be added.

CREATING THE ART

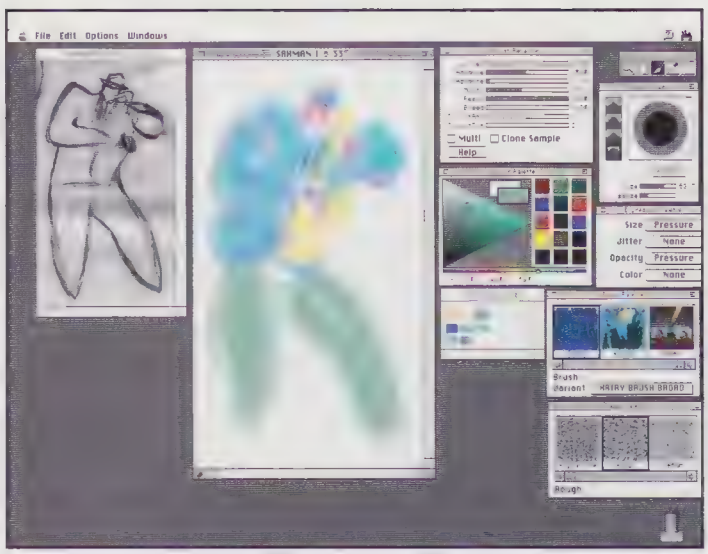
Color, texture, brushstroke and spontaneity of line were critical considerations, and so I relied extensively on my Wacom 12 x 17-inch drawing tablet with pressure-sensitive cordless stylus. With this tool, I would be able to achieve varying line weights within a single stroke.

Although Painter can be used effectively on a less powerful set-up, my computer system is configured to work efficiently on large scanned images in Photoshop: a Macintosh IIfx, 128 mb of RAM, 19-inch color monitor with 24-bit video card, 600 mb hard drive, 45 mb removable Syquest drive (for file transport), and 155 mb tape drive (for archiving). With smaller systems, files sizes would have to be kept smaller for reasonable screen redraw time and smooth flow of brushes. However, I found Painter 1.0 did become sluggish on my system with a 25 mb file loaded (the typical size of a high-resolution full-page image). I overcame this shortcoming by creating separate files for each of the figures in my image. These were later combined into the final file where the background strokes and finishing touches were added.

DIGITAL TRACING PAPER After scanning my pencil sketches of the individual figures on my AVR 400 dpi color scanner into Photoshop, making three 300-pixels-per-inch files ❶, I turned to one of Painter's most useful features, called Tracing Paper. It allowed me to "see through" my art to the scan of the original pencil sketch. As I applied the undertones with broad brushstrokes, I turned the Tracing Paper on, then off, to view the artwork by itself, without the template ❷. Later, I overlaid the outlines, the rougher strokes of varying thickness, to follow the contours of the sketch.

In addition to the Tracing Paper feature, Painter also has custom controls for different modes of image cloning—a process of duplicating an image so that you can create variations of the whole working image, sections of it or even alter the entire file to imitate media and styles as diverse as felt-tip pens or Van Gogh simulations. These

2 The Tracing Paper feature allows a file to be used as a rough sketch. In the working file the source image appears at 50 percent opacity. The new work also appears at 50 percent, but by temporarily turning off the Tracing Paper feature, you can view the artwork at 100 percent opacity. (Both the source file and the final image must be open for the Tracing feature to function.) A paper texture was selected from the palette of stock textures. In this case the Rough texture was used for the softer color of the figures, and later on Watercolor 1 was selected to increase the roughness for the outline strokes. A broad custom brush was created for the understrokes, and I saved the brush as a variant called "Harry Brush Broad." I chose the Grainy Soft Buildup method (which can be revealed by clicking on the zoom box in the upper right corner of the Brush Palette) for a grainy stroke, with gradual color buildup. For medium density I set Advance at 50 percent, and for a wetter look I set Resat (resaturation) at 100 percent. So that underlying color would not bleed, I left the bleed setting at 0, and for single stroke, monochrome brushing I left the Multi box unchecked. In the Expression palette, which governs the pressure-sensitive interface, I selected Pressure On for both size and opacity of the stokes, so that each stroke could be determined by the pressure I applied with the stylus. Lighter tones were selected by exploring different percentages of hue, saturation and value from the color palette

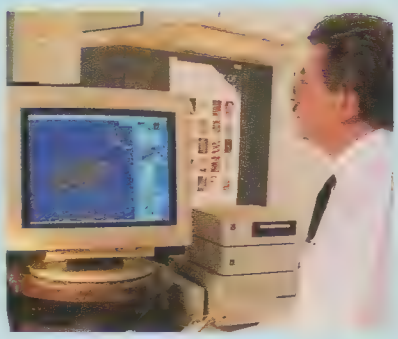


custom textures (like Photoshop or Gallery Effects filters) can be applied as individual strokes or automatically within a selection. In addition, there are varying levels of Undo which will eliminate mistakes in different ways. Photoshop filters can be accessed within Painter, and image masks can also be used to confine the work area to selected parts of an image.

PAPER PALETTE Painter also includes predefined libraries of paper textures which affect the grain of individual brushstrokes. These textures can also be applied globally to existing images, to cause them to appear as if they were printed on vari-

PRINTING PAINTER FILES

Painter's developers (Fractal Design) have done a masterful job of designing an interface and tools that give the artist the feel of traditional media like pastels, watercolors and pencils. But unlike PixelPaint, Photoshop and ColorStudio, for example, Painter provides no way for the artist to analyze the on-screen color in terms of its RGB composition, or to translate it into printing with CMYK inks. *Tip: Future versions of Painter may address this problem, but at the time of this writing, Painter 1.2 did not.*



The only option Painter offers is to work with the on-screen colors. But even in a system with perfectly maintained calibration, this approach still doesn't produce completely predictable printed color. Unlike Photoshop, which warns you when you choose a color that's outside the printable range, Painter provides no such warning.

Because he finds the tools and features of the Painter program so appealing, Stephen Harrison of Peter T. Noble Associates (at left) was willing to put some effort into working around the problem of reproducible color. He thought about transferring his illustration files back and forth from program to program, drawing in Painter, converting to CMYK colors in Photoshop, going back to Painter to try out new colors for those that didn't translate well, moving back to Photoshop to check translation again, and so on. But he rejected the idea. "With every transfer," says Harrison, "the image is going to be degraded a little bit."

After thinking the problem through, making some tests and conferring with Painter technical support, Harrison arrived at a solution. In Photoshop's CMYK mode, he sets up a palette that includes the colors he needs for his paper and pastels. He saves this Photoshop file and opens it in Painter. The Photoshop palette is carried over with the file, and he can use it in his Painter illustration.

–Linnea Dayton

Sidebar photo courtesy of Kim Brun Studios

ous paper stocks. For the featured watercolor illustration, rather than apply texture overall, I selected Rough Paper to give a coarse grain to the broad, smooth strokes of the undertones. For the outline strokes I selected Watercolor 1, because the Rough texture made the brushstroke appear too dry. (Refer again to ❷.)

Tip: According to Mark Zimmer, one of the creators of Painter, if you are applying a texture to a solid color, you can work faster and get better reproduction with the paper texture if you apply it overall, after finishing the drawing, rather than customizing the individual strokes. The color can be quickly applied with the Flat Color variant under the Special Brush in the Brush Palette. Then, to apply texture overall, simply select the desired texture in the Paper Palette, then Select All, choose Edit, Apply Surface Texture, lighting direction and shine or no shine in the Apply Surface Texture dialog box.

COLOR The colors can be chosen from an existing palette, or custom palettes can be created by selecting and adding new colors to replace the default selections. The best way to save custom color palettes in Painter is to create a separate file (in either Painter or another compatible color program). The colors can then be added to the default palette or sampled directly with the eyedropper tool in the toolbox by opening both the stored palette file and the working file together.

When you choose one of the 15 Color Squares in Painter's Color Palette window, the Triangle shows the colors available within that predominant hue. Because selections can be made only on the basis of hue, saturation and value (HSV), the problem for artists is that not all of the on-screen colors are within the printable color gamut with CMYK inks. *Tip: One Painter user recommends importing colors from a Photoshop CMYK palette into Painter's Color Squares, and then restricting color choices to the Squares only (rather than the Triangle). In this way, you can be relatively sure that colors in the drawing can be reproduced in print. (See the sidebar on the opposite page.)* For the jazz musician image, however, I selected colors directly from the HSV palette window and saved them to a small separate file for easy access.

BRUSHES Painter allows the artist to specify a medium for each brush (for example, Airbrush, Brush, Pencils, Chalk, Charcoal, Felt Pens or Crayons), a tip appropriate to that kind of medium, and a paper texture that the medium will interact with. So a variety of tools can be configured and customized to apply color with varying degrees of opacity; with flat or continuous build-up; with smooth or coarse strokes; with soft, hard or grainy edges in either fine or extremely broad diameters; and so on. Most of the brushes work in "real time" or with slight delay (although certain settings, like "Multi" style in the brush behavior selection, are quite slow). Even the behavior of each brush can be altered to achieve effects like spatter or drybrush.

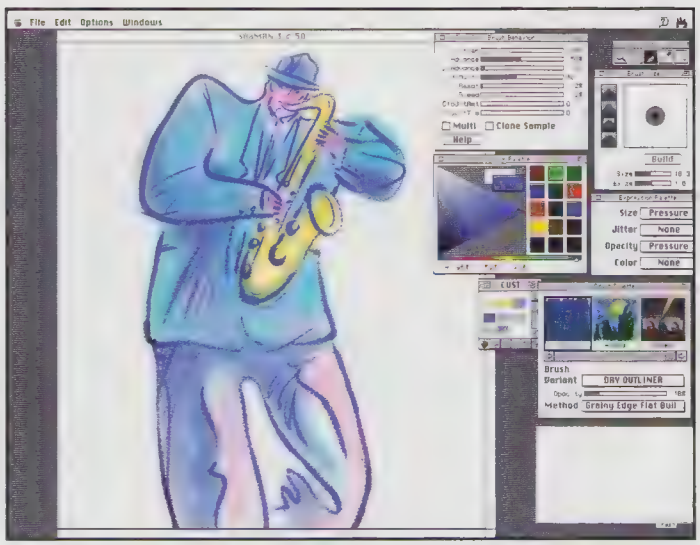
The Expression dialog box allows size, opacity, color and "jitter" performance (increasing "jitter" causes color to be applied more as dabs of paint than as linear strokes) to be controlled by the pressure and velocity of the stylus.

For this project, I used only two basic brush styles: The soft broad strokes, which were configured to be relatively transparent, with slow build-up of tone and paper texture throughout; and the coarser outlines, arranged to create more opaque lines which looked like dry brushstrokes or perhaps even a rough crayon. Values can be adjusted in the brush size window for line thickness or contrast in a single stroke ❸, ❹.

TACTILE CONTROL

Most of Painter's techniques and effects can be used to cre-

❸



3 To render the hard-edged outline strokes, yet another custom brush was created, which I called "Dry Outliner." A very coarse stroke was intended, so the paper texture was changed to Watercolor 1. This time, the Brush Behavior was set at two percent resat for a "dryer" look, and colors were dark bluish to define shapes and the motion of the figures. Grainy Edge Flat Buildup was chosen from the Methods menu for a gray-edged stroke with no additional color build-up.

4 Once the three figures were completly rendered, they were all opened, so each piece could be copied and pasted together into a new document.

4

CALLIGRAPHY

Villu Toots, widely known as one of the world's leading calligraphers and book artists, traveled from his native Estonia to London last summer to give a talk to the Society of Scribes and Illuminators. While in London, he had the opportunity to experiment with the calligraphy pens in Painter. After only half an hour, he had completed several pieces and was feeling comfortable using a pressure-sensitive tablet and stylus, according to Dave Taylor, Director of Marketing for Letraset's Graphic Design Software Division. (Toots is shown at work above.)

"Villu is 75, has never used a computer before, doesn't speak a word of English and we didn't speak Estonian. Yet he quickly accepted the look and feel of his work with Painter's tools, the antialiased screen images and the Canon Color Laser Copier output as being just like the real thing that he has been producing all his life."

Toots founded a Lettering Art School in Estonia, has organized many major exhibitions on lettering and calligraphy and has authored 12 books on calligraphy to date.

During his explorations, Toots selected the Calligraphy brush from Painter's Brush Palette window, under Special. Then he selected different colors from the Color Palette window and began experimenting with settings in the Expression Palette, which governs how the pressure-sensitive tablet and stylus affect the program's brushstrokes.

ate both original images or add to existing files and scans with professional quality results. The brushes' large diameters and generally smooth tracking are valuable additions to the digital artists' toolbox, especially for those working on large documents for print media. And graphic designers will quickly latch onto the capability of enhancing scans, graphics and headlines with brushstroke flourishes.

So in spite of current shortcomings, the program offers a unique range of professional features. And artists familiar with traditional media who may be new to electronic media will find the basics of Painter can be readily put to work.

As with any new software release, when I went beyond the default settings and dug deeper, I found the extensive selection of custom features presented in an interface which is not always intuitive, and for some artists it could be overwhelming. Some settings are redundant and some special effects work slowly or with considerable delay. *Tip: A newly released version of the program, Painter 1.2 for the Mac and Windows 3.0 features frisket editing, more brushes, more than 50 paper textures, and the ability to record strokes and play them back.*

Ultimately, there is a basic satisfaction artists will derive from the greater tactile control provided by natural media programs with a pressure-sensitive interface, something selection marquees, mouse-controlled cursors and keyboards simply cannot offer. ■

Nick Fain, principal of Electronic Images, San Francisco, specializes in electronic illustration, photo-enhancement and special effects.

STEP-BY-STEP

Adding Electronic Sparkle and Pop

Quick techniques for creating attention-grabbing digital graphics that won't chew up your budget or your schedule.

By Simon Tuckett

Digital graphics can display as much vitality, texture and sparkle as the liveliest of traditional graphics. To achieve this, you have to step back from the computer monitor every so often to evaluate just how much impact an illustration in progress really has.

Contrast and depth are by far the most important elements to consider when producing the artwork. But just how far should you go in concentrating on details? I would suggest you put in twice as many details as you think you should. People do notice them.

Details display elegance, an exquisite finesse, something that will give the viewer a reason to look at your work more than once. If you are working in color, there are plenty of opportunities to add details in terms of value. In black-and-white work, details can take the form of minute additions to the "big picture." I once drew a cinema audience silhouette that included a tiny cockroach on the shoulder of one of the characters (above). I don't know whether anyone ever noticed it, but if they did, they may have looked more closely at the rest of the illustration.

Of course, it's all very well for me to suggest you put hours of work into something that people will likely never notice. As a working designer and illustrator, I am aware of fiscal responsibility. So in this article, I have put together a series of techniques that add sparkle to art without chewing up the entire budget. The key to my approach is in taking advantage of an object-oriented drawing program's ability to structure things. FreeHand is a particularly good example of a program which allows such structuring. Layers, graphic style sheets and color style sheets all allow you to create and edit effects that might take hours to do traditionally.

As you apply these tips, put work in progress up on the walls so that you can glance at it every now and then. Try to gain some mental distance from the work. By analyzing how you feel about the piece, you'll get a feel for how your readers might receive it.

Pay Attention to the Details Black-and-white artwork can contain any number of minor details. While no one may have noticed it, in the movie audience illustration above, I added a cockroach crawling along the shoulder of one of the characters.

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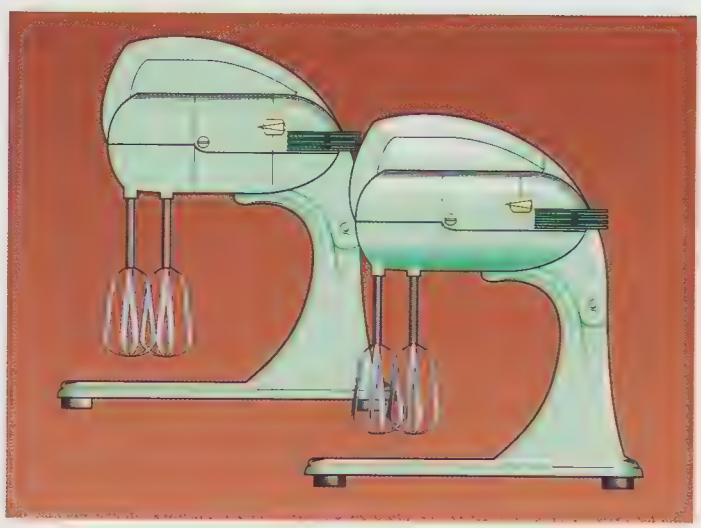


1 A quick illustration of a hard disk drive should go further than just creating shapes with plain fills (top). Here each of the faces contains a flat, even tone. By using ramps and blends, you can suggest not only the quality of light but more about the object's shape (below). Notice that the blend on the feet of the hard drive suggests there is less light striking the edge where they join the drive casing.

2 By implementing sharp ramps from the background color, you can suggest curvature, as in the case of the frontmost food mixer. The differences between that and the original are subtle but they give clues as to the object's shape.

ALTER THE ILLUSTRATION'S LIGHTING SCHEME

The quickest way to produce an illustration takes advantage of the computer's ability to render shapes (parallelograms, circles and so on) that build the image of an object. But look a little deeper and you will find these same illustrations bear no indication of light washing over the object. Many seem to be lit in a null ambient light atmosphere. Building such an image should be just the first stage in the illustration. The effect of light on an object can be relatively easily suggested with graduated fills in Aldus FreeHand or blends between darker and lighter objects in Adobe Illustrator ❶.

ADD HIGHLIGHTS These serve a triple purpose. They suggest lighting, texture (of the surface displaying the highlight) and detail. Highlights can take on many forms. You can, for example, ramp up to a sharp highlight from a background color to suggest a curved shiny surface ❷. You might consider putting a highlight on a dark object that has so little contrast between it and the background upon which it rests that it suggests a light-absorbing surface like rubber ❸.

OVERALL HIGHLIGHTS For a recent project, I was asked to create a series of archery arrows. Rather than spend a lot of time figuring out the complicated perspective and lighting for an arrow, I created a profile sketch and used it as reference for building a three-dimensional database in Zing, a 3-D modeling application (Enabling Technologies). *Tip: This program is no longer available.* Within one-half hour, I had a relatively good color model of the object that I could rotate to the desired angle and perspective. I also spent some time selecting a relatively dramatic light source. This art was saved as an Illustrator 1.1 file that I could place in the background of a FreeHand document, to be used as an on-screen reference for the redrawing of the image ❹.

I chose to redraw the arrow because the Illustrator file my 3-D program produced *looked* like it had been created in a 3-D program. And since the illustration would appear on all manner of printed materials at many different sizes, it needed to be more detailed and realistic. I also wanted to be able to edit the file quickly.

By the time I had redrawn the image (another half-hour), I had all the colors defined as style sheets and a file that was one-quarter of the size of the original used as reference. (Refer to ❹.) Redrawing the arrow provided additional benefits: For example, I could easily change the properties of some of the

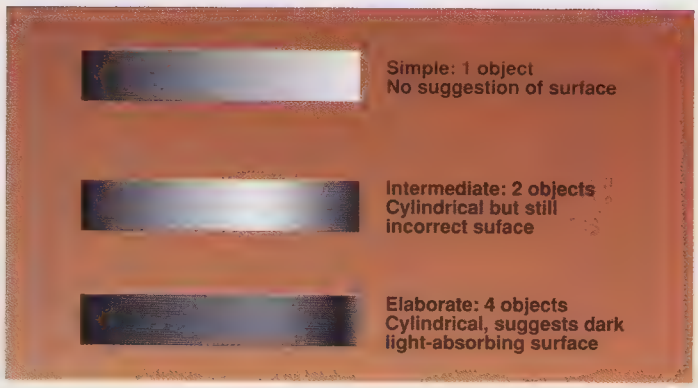
shapes. In one trial, I tried a version in which the arrow shaft had a chrome finish, created with short blends and very high contrast. (Refer again to ❹.)

The redrawn art remained faithful to the reference in that it maintained the overall effect of the light, but by redrawing the object I was able to inject more contrast overall and add more contrast to those areas that didn't appear sufficiently separated.

LOCALIZED HIGHLIGHTS The nature of the light can also be suggested by the way the highlight appears. A sharp speck surrounded by a glow can suggest a bright pinpoint of light hitting a highly reflective surface. Unfortunately, in object-oriented illustration applications, this can become remarkably difficult: Defining ramps to display a circular glow is enormously complicated on anything but the simplest of surfaces. Some surfaces, like the glow at the tip of the arrow in our example, lend themselves to the task, however ❺. Because a vector illustration is opaque, everything in the glowing area must be redrawn.

When defining shades for this effect, be careful not to be heavy-handed. The effect should be faint, just enough to add a little sparkle without drawing attention to the effect.

PAINT PROGRAMS Bitmap programs provide much more freedom in producing this type of highlight: You can simply select an airbrush tool with wide coverage and white as the paint color. Set the tool to 50 percent opacity and highlight the area gently. Then go for a fine point, 100 percent opacity, and burn in the center. Unfortunately, unlike vector-based programs, the effect is difficult to remove once it has been entered. It's wise to save the illustration at several stages so that you can go back and replace a treated area.



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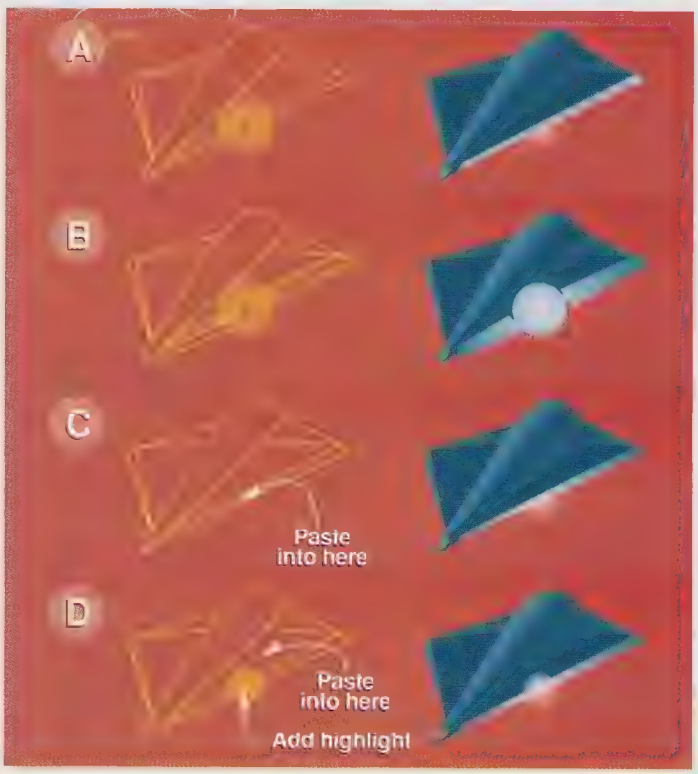

3 Similar clues can suggest material through the careful choice of the tones for the mixer's feet (top and center). Simple toning will do little more than describe a curved surface. More elaborate treatments will suggest a light-absorbing material like rubber (bottom).

4 This illustration of the arrow at left was exported from Zing, a 3-D drawing program. The program suggests lighting as well as shape. This was used as reference for a higher quality redrawing of the image (center). By redrawing the artwork in FreeHand, I could get rid of the faceted appearance prevalent in the output of most quick 3-D programs. I could also heighten the contrast, place ramps on the fins where more contrast was needed, and add highlights on the point. Generating a chrome shaft version of the arrow was relatively simple (right). The base blend in the shaft was replaced with one featuring several short blends, displaying high contrast.

5 To create the glowing highlight, a circular blend, first I defined a circle the same color as the background and blended it with a smaller, lighter circle inside the main shape. This was sent to the top of the background layer (A). I then took copies of these circles and superimposed them over the side of the arrowhead, creating another blend, but this time using values prevalent in that side. In addition, a couple of graduated shades were prepared on either side of the circles (B). These objects were then pasted inside the polygon describing the side surface (C). (Had I been working in Illustrator, I would have been grouping all these blends with copies of the surface objects used as masks.) Another slightly smaller blend was pasted into the arrowhead's top panel. Then a small circular blend from gray to white was superimposed over the highlight portion of the side panel (D).

6 If you use a hard-edged shadow, then at least fill it with a graduated shade that is darkest near the object and fades out to the background color (left). The best type of shadow is a soft-edged one (at right), a blend from an outer shape that repeats the background color to an inner shape that is darker and much closer to the main object. (See inset path map.)

7 You can quickly place soft shadows underneath complicated shapes by turning the image black (don't save the filled version), getting a screen print and then softening the screen print in an image-editing program. Place this softened version under the EPS artwork of the original image and you have a shadow. Alternatively, you can get a similar effect by tracing a path around the edge of your original object, cloning this path and then moving the original path further out, smoothing it at the same time and blending between the two. (See inset path map.)

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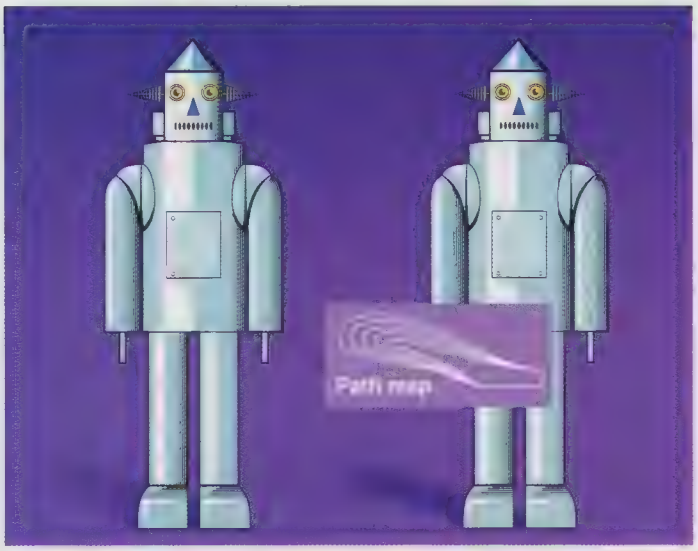

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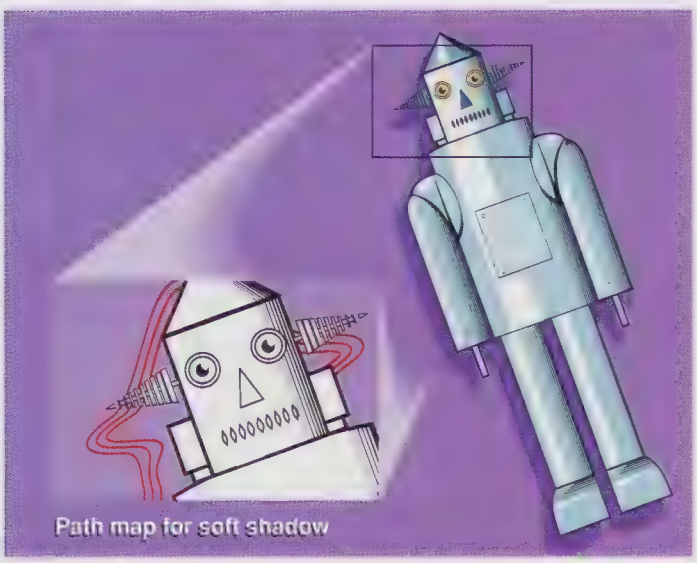

INTRODUCE SHADOWS FOR DIMENSION

Shadows can take many forms. Unfortunately, many people only consider creating a hard-edged shadow. It is expedient but not very realistic and, because of its harsh edges, has a tendency to draw attention to itself.

THE HARD EDGE If you only have time for a hard edge, look at the possibility of placing a graduated shade in it. It will diffuse its coarseness and, at the same time, help lift the image off the paper with a minimum of effort. Start the graduated shade at the background color, away from the object, and ramp up to that same color plus 30 percent black underneath the object casting the shadow ❻.

THE SOFT EDGE The ideal shadow is one that takes the form of a blend between two shapes. The outer shape describes the edge of the shadow, and the inner shape describes the darkest portion of the shadow. The best way to create this is to draw the outer shape, duplicate it, and reshape the points and their associated Bezier control points for the inner path. Remember to keep the points on the two paths relatively close where the shadow joins the object itself. This will help suggest a proximity between the two objects, indicating less diffusion of light where they lie close to each other. (Refer again to ❻.)

A SOFT OUTLINE Another, rather fun type of soft shadow can be easily generated. Select your entire object and paint it with black fills. Now get a screen capture of the object and import that into a grayscale painting program. (Do not save the black-filled version of the illustration.) In the grayscale program, remove all the unwanted screen clutter from the screen capture and select the entire image. Diffuse and blur it until the edges are soft. Now revamp its graymap so that it has zero to 40 percent gray values. Save this as a TIFF or in whatever grayscale format your page layout application supports. Place this in the background and float an EPS version of your illustration above. Suddenly the artwork pops off the page ❼.

A variation on this theme that allows you more control over the image and keeps you in the drawing program is to trace a rough outline of the image and then duplicate and expand the duplicate to cover a wider area. Bring the inner path to the front and blend between them. This blend can be offset to suggest the same type of soft shadow. (Refer again to ❼.)

IMAGE SHADOWS Whenever you are laying out your grayscale or color bitmap work in a page layout application, consider placing the shadow of one image over another ❽. However, this

should be one of the last things you do to the layout, as it can get tricky to alter once done.

TEXTURES While this isn't really a shadowing technique, you can certainly give a lighter illustration some pop by setting it against a darker textured background. Such backgrounds can be created with any image-editing software. ImageStudio, for example, has powerful random tone generators built right in. Photoshop and ColorStudio possess equally powerful random effects such as Gaussian ditherers that scatter pixels through colors in given ranges. The background can add a mood that would be difficult to generate in the drawing program alone ❾. You can also use the masking capabilities in these programs to fade the effects out to white.

CREATE TRANSLUCENCE

The generation of translucence is an illustrative effect with which you need all the structuring help your drawing software can provide. For instance, suppose I chose to superimpose an archery target over the illustration of the arrow ❿. With the arrow already drawn, I had two choices. In the interest of preserving disk space, I could illustrate all the lighter faces inside the circles. This would involve duplicating the artwork appearing inside the target faces, editing the paths and changing their respective fills to a lighter tone. Alternatively, I could use the technique of exporting, editing the colors and importing, essentially making a duplicate of the entire illustration for each of the rings in the target. This requires more disk space and more printing time, but less hassle. I chose the latter route.

Translucence requires that you treat the "see-through" area with a lighter tone. But object-oriented programs are opaque, so this is a difficult technique to

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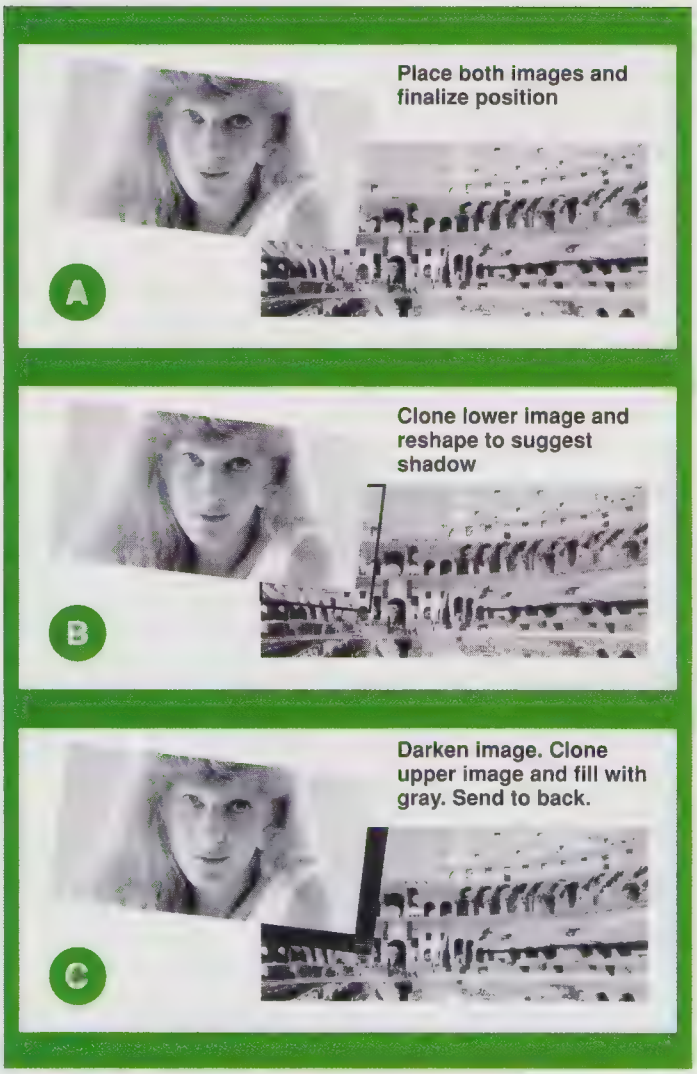
Place both images and finalize position
A
Clone lower image and reshape to suggest shadow
B
Darken image. Clone upper image and fill with gray. Send to back.
C

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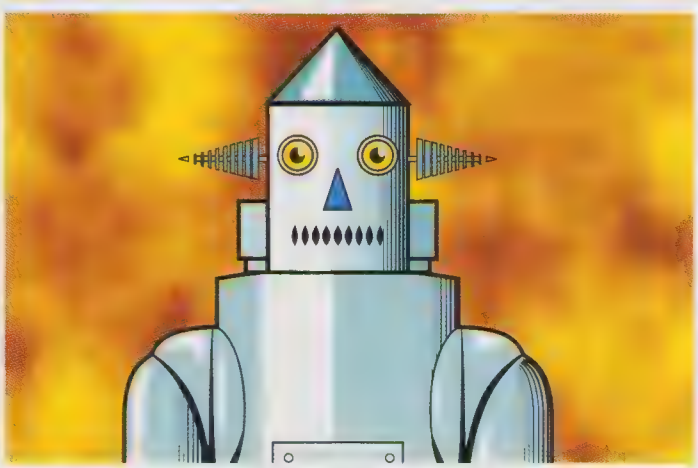

8 You can create convincing shadows of images (both RIFFs and TIFFs) in your layout application. (I am using QuarkXPress here, but the same technique will work in PageMaker.) First, place your lower image in a picture block. Above this, float another picture block and import the second image. Position them as needed (A) and duplicate the lower image picture block. (Perhaps "clone it" would be a better command since it should remain in exactly the same position.) Now reshape the picture block to reflect an offset version of the shape of the floating picture block (B). Finish this off by going into the Image Control dialog box to darken the reshaped image (C). Don't forget that if the upper picture sits partially outside the lower one, you will need to support the impression of the shadow with a null tone under that part which sits on the white paper.

9 Consider giving lighter illustrations generated in your object-oriented drawing program a random background generated in an image-editing program. These programs can easily produce effects that would take hours to draw in the illustration package.

10 After the circles were created, they were positioned over the arrow and retained as lines with no fill. The two outer paths were joined, then the two center paths, followed by the two inner paths nearest the bullseye.

11 If you are working in FreeHand, Copy all the artwork (including the background, excluding the circles) into a new document. The object and color styles should be edited to be 40 percent lighter. Now Copy the material back into the original main file. Once you have separated the copy from the main style sheets, you can modify them independently of the original styles.Illustrator works a little differently. When you create your art, use only Custom Colors. Save the file. Modify the definitions of all the colors (multiply each by 60 percent, for example), essentially tinting them. Change the name as well; I often specify what the tint is: "Red 40%," for instance. Copy all the artwork to the clipboard, Close the file without saving changes and Open it again. Paste in the clipboard copy and bring up the Custom Colors dialog box. Now you have a bunch of newly defined colors that can be refined later.

12 The two images were lined up and the lighter one Cut to the clipboard. This was then Pasted into the outer circle of the target.

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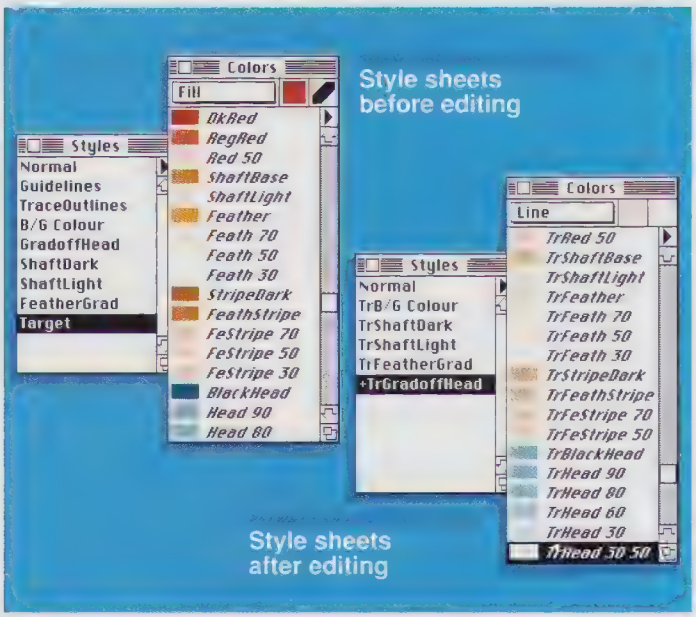

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create. However, if you have all your colors named (using Custom Colors in Illustrator) or in style sheets (in FreeHand), you can do the tinting almost automatically. Make sure that all the colors of the objects passing through the translucent object have been named ⓫.

Whether you work in FreeHand or Illustrator, the next stage in this process is to reposition the duplicate back in the original FreeHand document in exactly the same position as the original artwork. Then cut it to the clipboard and paste it inside each of the bands describing the target form, repeating the procedure for each band. While relatively tedious, this process can be much less nerve-wracking than drawing each individual shape and then trying to calculate just what shade it should have ⓬, ⓭.

Tip: When repositioning in FreeHand, if you will be cutting something from a document and then bringing it back later, group it first. Hit Command–I and the Group Information dialog box will appear. Write down the numbers describing its position, ungroup it, and cut it into the new document. After the editing, you can bring it back to exactly the same position by grouping the edited version, hitting Command–I and entering the coordinates you wrote down. As soon as you hit the Enter button, the artwork will fly back to its original position.

CREATE REFLECTANCE

We have already discussed the creation of surfaces which are only mildly reflective. However, illustrators are often called upon to create highly reflective surfaces, like chrome or metallic finishes. While there are few shortcuts to producing such effects, they are possible and can look quite impressive. The se-

cret is in being able to control the blends and create accurate curves. Once again, the original building blocks are the same: hard, opaque objects that simply describe a shape. Their tones should be chosen as the base on which all the blends will sit. In the case of chrome, you can choose either black or white as the base. While it is relatively easy to suggest sheens on flat surfaces ⓮, it is perhaps more difficult to suggest the curvature of an object with blends ⓯. The high contrast between the shades and the relatively short blends between the darkest and lightest areas will provide the impression of high reflectivity. Integrate some background element into that surface and you begin to suggest an almost mirror-like surface.

YOUR GOAL The key to getting as much sparkle into your artwork as the budget can allow is in getting the computer to do as much of the work as possible. In this way, you free up time to spend working on highlights and shadows. Use timesaving features (like turning off colors on your monitor when you are working in black and white, and viewing only a few layers of your artwork at one time) to speed up the entire drawing process. You'll find that these techniques will give you more time to wonder just how big that teeny cockroach should really be. ■

Simon Tuckett is director of Creative Services for RoboShop Design Ltd., a Toronto-based electronic design studio which uses the Macintosh to produce design and illustration for the advertising and promotional markets.

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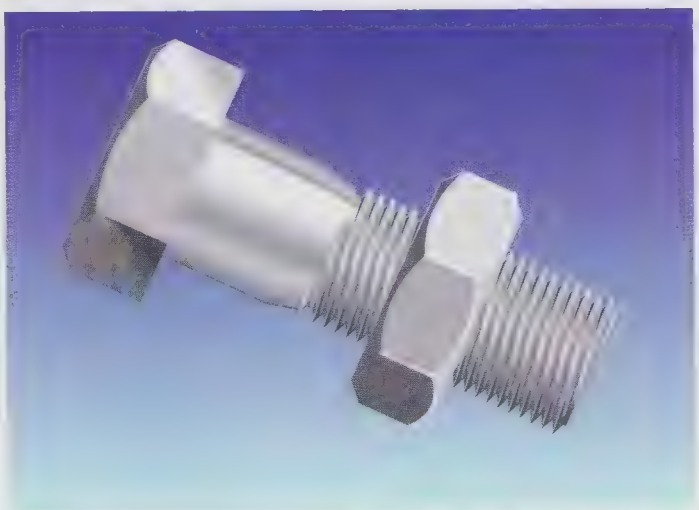

13 The same image on the clipboard was pasted into each of the other three objects in the target, resulting in a translucent target floating above an arrow.

14 By blending between one shade and another with a wide contrast, you can begin to suggest high reflectivity. However, the object still has flat surfaces and little more than a sheen to describe how the light is striking it.

15 Curved, shiny surfaces can be suggested by concentrating on creating the impression of a multiple light source environment. Bright and dark bars are reflected in the side of the cylindrical bolt.

STEP-BY-STEP

Layering PostScript Lines and Color Bitmaps

How to combine hard and soft edges in PostScript illustration.

By Linnea Dayton

Sometimes the brilliantly smooth, crisp lines that are the hallmark of PostScript illustration programs like Aldus FreeHand, Adobe Illustrator and Corel Draw seem just too perfect, too smooth, too flat. How can illustrators maintain that precise PostScript control of their linework and yet develop a depth and richness that the hard-edged lines of PostScript lack? One solution is to combine PostScript illustration with color bitmaps produced in a program like Photoshop. (See the illustration at left.)

STARTING WITH A SCAN

A hard-edged/soft-edged drawing can begin with a sketch on paper, which is then scanned and opened as a template to be traced in Illustrator's Artwork And Template mode. The sketch can include both the smooth curve elements and those that will be rendered as "fuzzy" (or textured) areas.

SOFT-EDGED SHAPES In Illustrator, the first step is to use the pen tool to trace the fuzzy parts of the sketch—that is, the parts that will be imported into Photoshop for softening. When these areas have been outlined and filled with the color, save the Illustrator file. *Tip: To keep the Illustrator file small, you can omit the EPSF header; it is not needed for importing the file to Photoshop.*

Open the EPS file in Photoshop by choosing Open from the File menu and selecting RGB or CMYK mode, Antialiased and an output resolution about 1 to 1½ times the line screen frequency to be used for printing.

Shapes drawn in Illustrator (as well as other shapes defined by Photoshop's various selection tools) can be selected, feathered at the edges to create an out-of-focus look, or treated with filters like Blur, Noise and Find Edges to create a range of textures ❶. The file can then be saved in the preseparated EPS/DCS five-file format appropriate for importing into Illustrator. Choose Save As, EPS, DCS, ASCII, 8 Bits/Pixel.

HARD-EDGED LINES Back in Illustrator, a new file is created, with the same original sketch used as a template. In this file, the hard-edged lines are drawn over the template guide. To get the template out of the way temporarily so the linework can be inspected in detail, choose View, Artwork Only ❷. When the linework is complete, Select All (from the Edit menu) and Group the elements so they can later be moved as a unit.

PUTTING IT TOGETHER

The last step in the illustration process is to combine the two layers. Start by importing the Photoshop file into Illustrator with the File, Place Art command and sending it to the back (Send To Back from the Edit menu, or Command-hyphen). Selecting Show Placed Images in the Preferences dialog box (from the Edit menu) shows a black-and-white version of the imported Photoshop file in the Artwork Only view, so that the linework can be accurately positioned on top of the softer forms ❸. The file is then saved in EPS format to be separated with Adobe Separator or placed in a page layout program such as QuarkXPress for separation there.

PROCESS VARIATIONS

As with almost every electronic design or illustration endeavor, there's more than one way to accomplish the hard-edged/soft-edged result described here. For instance, the scanned sketch can be omitted from one or both phases of the drawing process, FreeHand can be used instead of Illustrator, or the soft-edged portion of the project can be done entirely in the bitmapped program.

OMITTING THE SKETCH If a very

Texturing Smooth With Soft San Francisco-based illustrator Steven Lyons, recognized for his work in bitmapped painting and image-editing programs as well as PostScript drawing programs on both Mac and PC platforms, finds the combination of Photoshop and Illustrator ideal for such illustrations as this one (opposite). Lyons provided the 8.5 x 11-inch illustration at the request of art director Ron Campisi of Boston to open an article about computer graphics user interfaces that appeared in *Profiles* magazine, published by Progress Software Corporation. Lyons "texturizes" his images by combining smooth PostScript linework with softer color bitmaps.

1 In Photoshop, Lyons turned the smooth lines of his imported Illustrator artwork into soft color forms. He outlined the computer operator with the pen (Bezier curve) tool, changed the outline to a selection by clicking the pen icon inside the outline, chose Feather from the Select menu to blur the outline, and filled the shape with black. In other areas of the image, he used the selection rectangle, lasso and pen tool to select parts of his imported Illustrator artwork to be treated with his two favorite filters: Noise (to create a "granulated" look) and Blur (to soften). In some areas treated with Noise, he also applied the Find Edges filter to arrive at an even coarser texture and a more variegated color.

tight sketch is not needed for comping purposes and if the illustrator is comfortable starting out electronically rather than on paper, the template can be omitted. Or it can be used for the first phase of the process only, and then the on-screen version of the Photoshop EPS file can be used as a guide for putting in the smooth linework. If the imported image sometimes gets in the way of viewing the details of the linework, it can be "turned off" temporarily by choosing Arrange, Hide or by deselecting Show Placed Images in the Preferences dialog box.

WORKING IN FREEHAND Although Adobe Illustrator is currently the only program whose EPS files can be placed in an already existing Photoshop file, other EPS files (for example, those of FreeHand 2.01 or the 72 dpi PICT previews of other FreeHand versions) can be opened in Photoshop. So the simple linework for the soft-edged layer, for example, can be drawn in FreeHand rather than Illustrator, exported in EPS format and opened in Photoshop. *Tip: Any FreeHand drawing more complex than unfilled or black-filled linework may not transfer well when opened in Photoshop. However, the EPS Exchange program from Altsys makes it possible to export FreeHand files in Illustrator 88 or 3.0 EPS format, which can then be opened more successfully in Photoshop or even placed in existing Photoshop files. Note that because of the differences in the way FreeHand and Illustrator create patterned fills, composite paths and masked objects, the translation to Illustrator may not be 100 percent accurate, and complex translated files may need some adjustments in Illustrator before being opened in Photoshop.*

The finished Photoshop file could then be saved in five-file EPS/DCS format (choose Save As, EPS, DCS, Binary, 8 Bits/Pixel) and placed in the FreeHand file that contains the hard-edged linework.

STARTING IN PHOTOSHOP Instead of doing linework for the soft-edged shapes in a PostScript program, it could be done in the bitmap medium, with or without a scanned-in sketch to paint over. The advantage of this alternative is the time savings in transferring the file from one program to the other. A disadvantage is that adjusting the shapes, sizes or positions of elements in a drawing takes much more time and effort in a bitmap than in an object-oriented drawing program. Also, most bitmap applications lack the precise snap-to grid of object-oriented programs. *Tip: An export filter included with Photoshop 2.0.1 (called Paths to Illustrator) allows pen tool outlines saved as paths to be placed in Illustrator as Bezier curves. So shapes originally drawn in Photoshop can be used for fitting type to a curve, for example, which can then be imported into Photoshop, where it will fit the original curve precisely.* ■

Linnea Dayton is editor of Step-By-Step Electronic Design *and electronic design editor of* Step-By-Step Graphics *magazine. She is a contributing editor to* Verbum *magazine and is coauthor of the Verbum Book series.*

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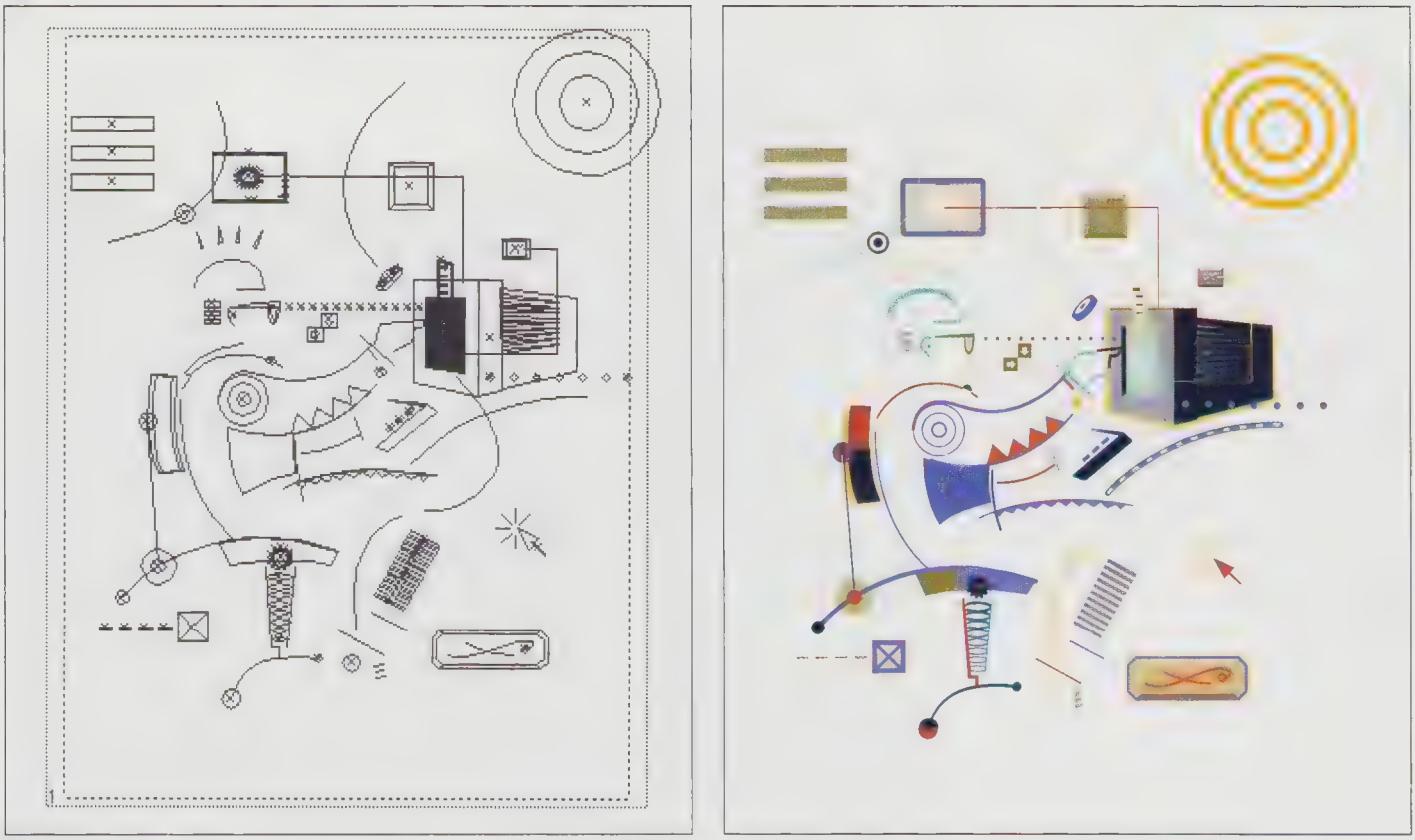

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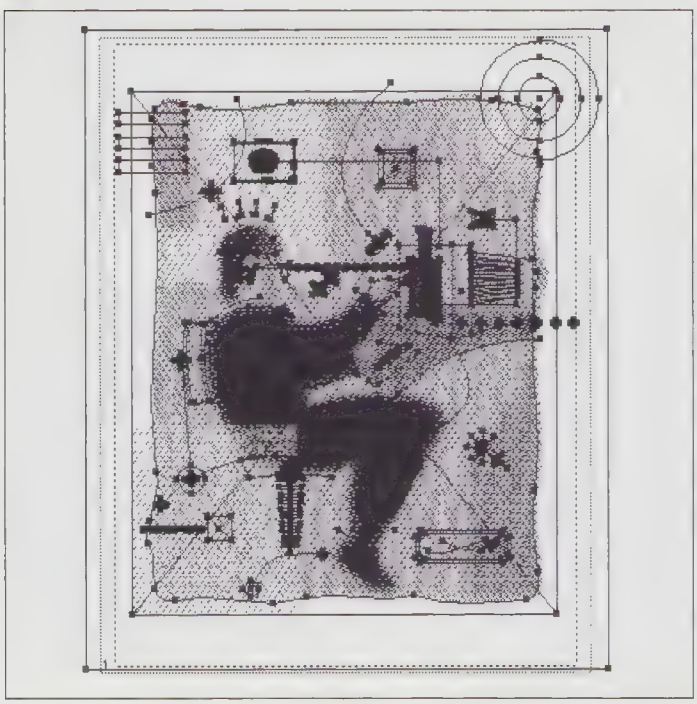
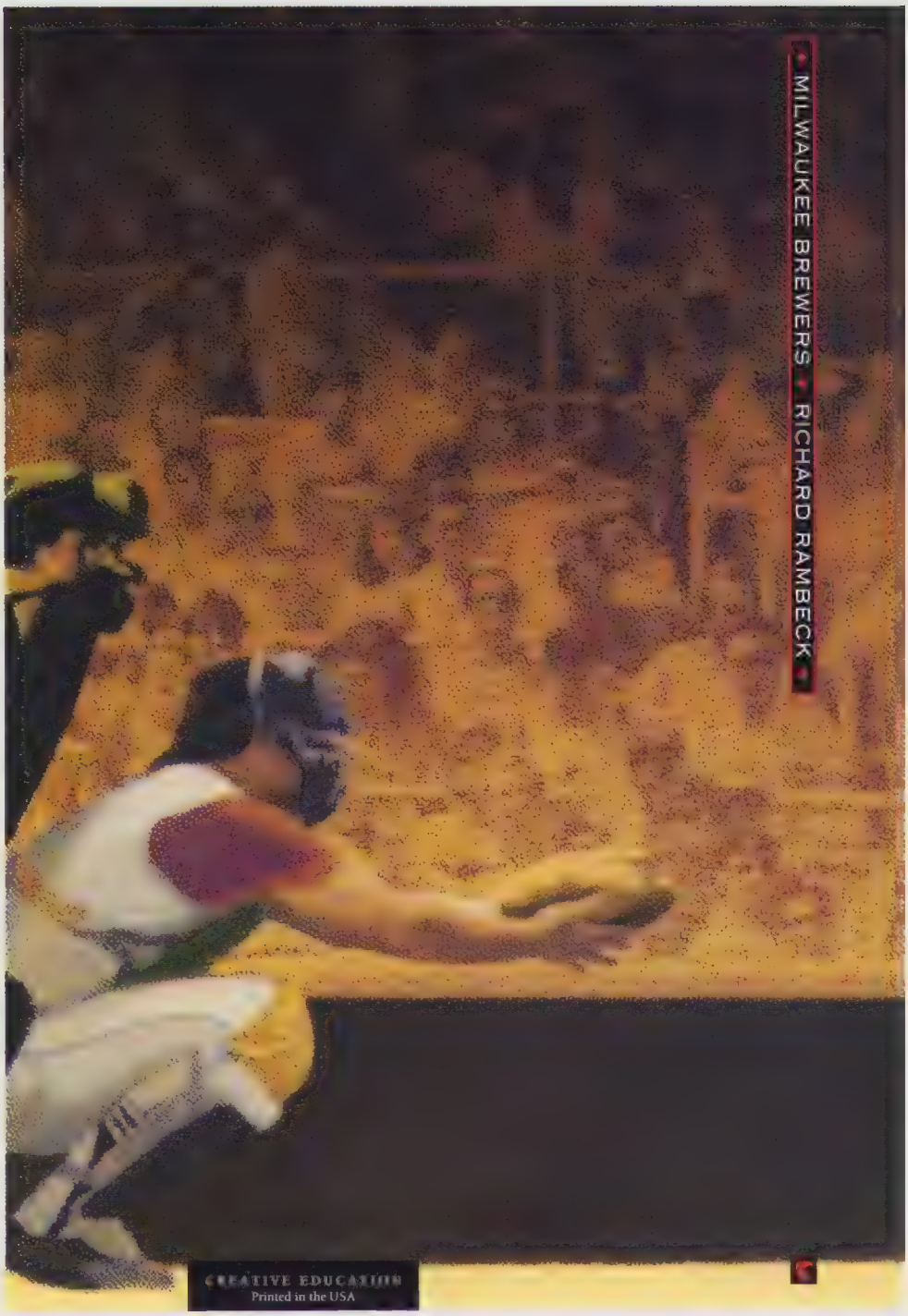


2 The hard-edged linework was completed in Illustrator with various drawing and construction techniques. (The Artwork Only view is shown at left above, the Preview mode at right above.) For instance, the spring in the chair's pedestal, the line of red dots from eye to screen, the lines in the pull-down menu and the patch of stripes on the leg were constructed by drawing the two end elements and then blending between them with a specified number of steps. The yellow dotted curve is a round-ended, dashed line with the dash size set at 0 and the spaces at about 5 points. The two-color curve that defines the desktop was drawn with a purple line that was cloned (Copy, Paste In Front); the clone was assigned a different color, a dashed pattern and a stroke weight half that of the original line underneath. The concentric circle elements in several places in the image were made by drawing the largest circle first, cloning it, clicking the clone's center mark with the scale tool (with the Option key held down) and resizing the clone through the Scale dialog box.

3 Importing the Photoshop EPS into Illustrator with Show Placed Images selected in Illustrator's Preferences dialog box resulted in a black-and-white, on-screen version of the image. Lyons sent the imported art to the back layer of the file and could then adjust the position of the grouped overlying lines. He made a frame for the image by forming a compound object: a white-filled rectangle bigger than the page and a smaller curving rectangle inside it to serve as a window that would let the artwork show through. The curved rectangle was then cloned twice and assigned line characteristics similar to those of the desktop curve described in Figure 2.

Illustrating Scanned Photos With Texture and Color

From scan resolution to proofing and output, you'll learn how artist Rob Day uses the natural "grain" of the bitmapped computer image to produce a mezzotint-like texture.



By Janet Ashford

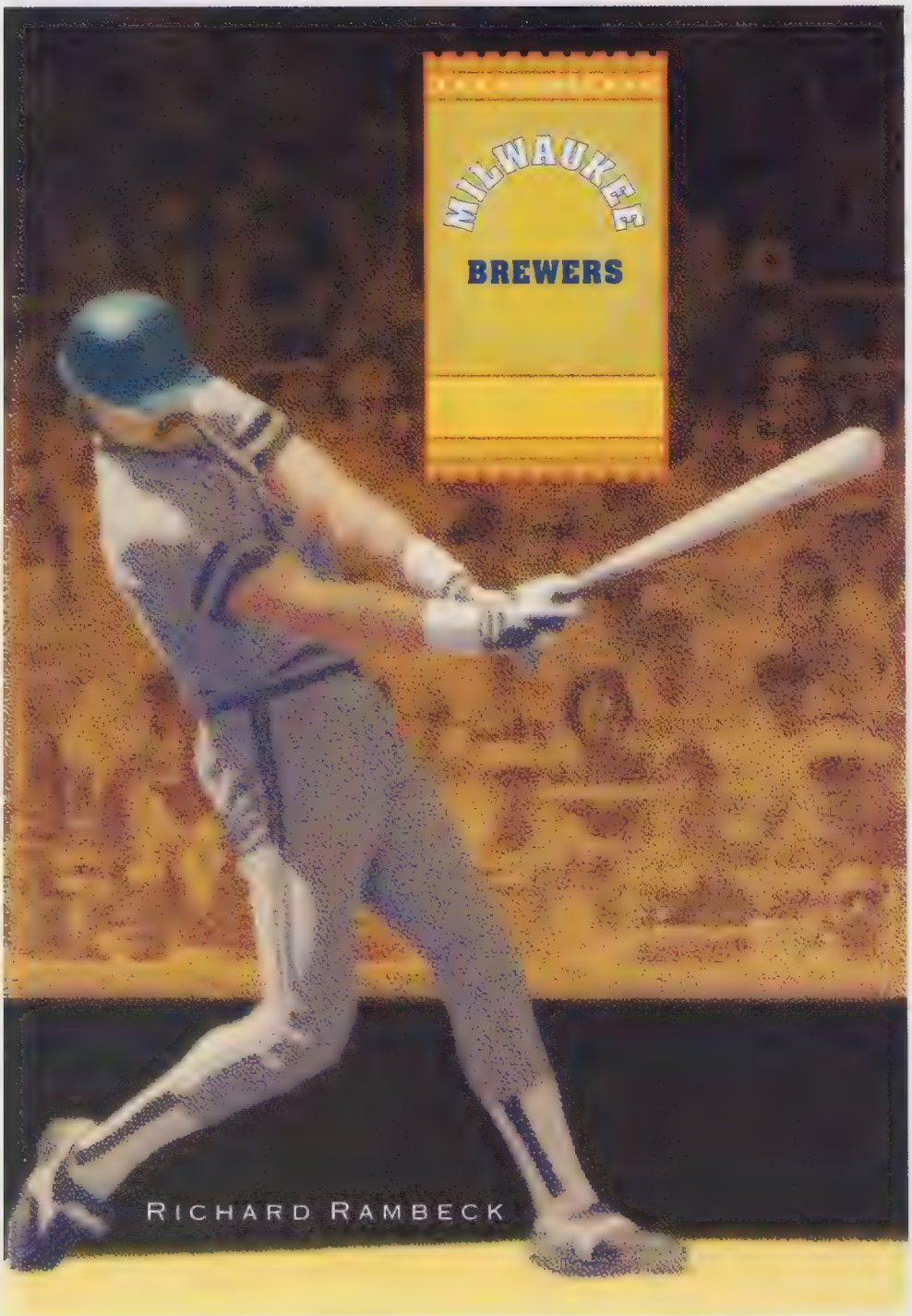
Just as a woodcut maker takes advantage of the grain of the wood, illustrators and designers can use the natural "grain" of the bitmapped image.

And Rob Day's nostalgic, mezzotint-like textures demonstrate beautifully how computer artists don't always have to work "against the grain."

A former silk-screen printer with a printmaking background, Day has developed a method in which photographs take on the look of art prints when he adds soft color and overall texture in Photoshop. Rather than completely hide the look of the bitmapped computer image, Day, of Massachusetts-based Lance Hidy Associates, chooses to use it to his advantage.

In a recent project—one in which he and colleague Virginia Evans used Photoshop and Illustrator to create 26 book covers for a Creative Education baseball series—Day demonstrated this photoillustration technique for *Step-By-Step*.

Rita Marshall, art director for Creative Education publishers, told Day and Evans she wanted photos of team members in play to bleed across front and back covers. She specified a somewhat nostalgic look that included "stickers," the geometric emblems which would incorporate the title typography for each book. The photographs were mostly Associated Press stock, supplied as



8 x 10 glossy black-and-white prints by the Bettmann Archive. Where possible, photos taken before World War II were used. Day's goal was to minimize the time-period differences among the photos through color and texture.

SCANNING RESOLUTION & SIZE

Day and Evans worked together to decide how each photograph should be cropped. Then in preparation for using a Microtek 300Z flatbed scanner to scan each photo and open it directly in Photoshop, Day did some planning in advance to determine the best resolution. First, through experimentation, he determined that he wanted the final images to be rendered at a low resolution of 65 dots per inch, in order to produce the overall texture pattern he wanted. Since the source photos were smaller than the final 11 x 16-inch size of the book covers, the artist could not scan them at 65 dpi and enlarge them to final size without losing detail. So Day used the following formula to determine a scanning resolution that would produce images at the correct size: Multiply both the final height and final width by the dpi you desire. Then multiply those two numbers to determine the number of bytes the file should be. For example, for a grayscale image size of 11 x 16 and final dpi of 65, the formula would read: (11 x 65) x (16 x 65) = 715 x 1,040 = 743,600 bytes = 744K. *Tip: For an RGB color image, which includes three channels, the final number would be tripled.* Day then adjusted the resolution in his scanning window until the read-out for estimated file size came close to the number he wanted. For the baseball book covers this meant that most were scanned at about 150 dpi. At the same time, Day also used the scanner to roughly crop

History of American Baseball Series Illustrator Rob Day's objective was to minimize time-period differences among 26 different cover photos in the book series by adding soft color and overall texture in Photoshop. This contemporary photo of the Brewers, for example, was supplied by the Bettmann Archives.

1 Double-clicking on the cropping tool brought up a dialog box in which Day entered the final width, height and resolution of the photograph. Dragging across the image with the tool, Day drew a rectangle to select the part of the image he wanted. When using the cropping tool it's important to make sure that the original image is of high enough resolution, that when the cropped area is re-sized the image is not "up-sampled" from a lower to a higher resolution, thus losing detail.

2 Day used the rubber stamp tool in Clone mode to paint out the catcher in the original photo, covering it with the sampled image of the crowd background. Then the catcher and umpire from another photo were copied and pasted into the image. Subtle evidence of the cloning operation is visible in the final image, where the same woman's head appears both to the left of the umpire and above the catcher.

3 To save the PostScript path drawn around the batter, Day chose Save Path from the pen menu. In the dialog box which appeared, he gave the path a name so he could call it up again if needed. He then chose Select from the pen menu to convert the path to an active selection. One can also convert a pen path to a selection by simply clicking inside the path outline.

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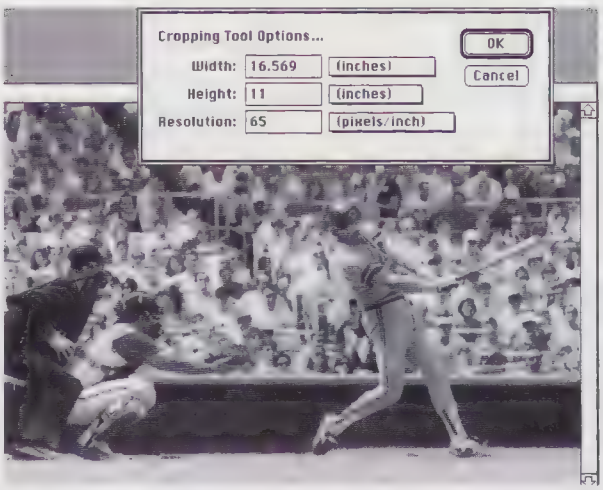

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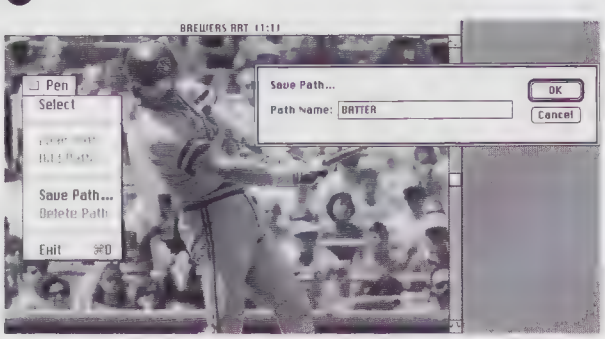

each 8 x 10-inch photo to the longer proportion of the book covers.

Once all the photos were scanned, Day needed to more precisely set their resolution and size. He opened each photo in Photoshop and double-clicked on the Cropping tool to set the desired width, height and resolution ❶. Now when he used the tool to draw a selection rectangle, its shape was constrained to the proportions defined by the height and width he entered. Once he selected the portion of the image he wanted to use, it was automatically cropped, resized and resampled to the appropriate size and resolution.

EDITING THE ORIGINAL IMAGE

Some of the grayscale images required editing before texture and color were added. In the original photo supplied for the Milwaukee Brewers, for example, the catcher is partially cut off at the left edge of the image, while the batter is positioned properly in the front cover area at the right. So Day removed the catcher by painting over that area with the crowd background, which he picked up by Option-clicking on the background with the rubber stamp tool in Clone mode. This sampled the image from the click-point and loaded it into the tool as "paint." After painting over the catcher, he opened another scanned photo, selected the figures of catcher and umpire, copied them, and pasted them into the Milwaukee Brewers image. With the figures still selected, he positioned them ❷.

SAVING SELECTION OUTLINES

Day wanted to apply a gold tone to the background area that shows fans in the bleachers, and apply cooler tones of blue and green to the foreground figures of batter, catcher and umpire. To do this, he first needed to select the figures so that they could be edited independently of the background. Day used Photoshop 2.0's new pen tool to draw PostScript paths around the figures and saved these paths using the Save Path command. The pen tool makes it possible to save selection outlines in PostScript form rather than as grayscale information in mask layers, greatly reducing the amount of file size and memory needed to preserve the information. *Tip: The outlines or paths can be named and accessed again and again. The pen tool, which works in the same way as the pen tool in Illustrator, is also more precise than the lasso tool for drawing selection outlines* ❸.

Day created the selection outlines a few

steps before he needed to use them, since he knew that the texture he planned to apply would make the image outlines fuzzier and harder to see and select.

APPLYING AN OVERALL TEXTURE

Before applying colors to the foreground and background elements, Day applied a texture to the entire image. First he converted the image from grayscale to bitmap mode by choosing Bitmap from the Mode menu. He chose a Diffusion Dither and left the input/output levels both at 65 dpi. This applied a very grainy texture to the image, which now looked almost like a pointillist painting. In order to add color to the image, Day converted it back to grayscale and then to RGB color mode. *Tip: Images cannot be converted directly from bitmap to RGB.* The dither which was applied to the bitmap was retained through the subsequent mode changes ❹.

Once in RGB mode, Day used the Levels control from the Image menu to reduce the contrast of the image by sliding the indicators on the Output Levels scale from the outside ends of the scale closer to the middle. This had the effect of adding some gray to the otherwise black-and-white image ❺. Day then added to the texture by applying the Add Noise filter. He experimented with different amounts and previewed the results before settling on 18 with a uniform distribution ❻. His goal was to produce a texture similar to a mezzotint.

ADDING TO THE BACKGROUND

Day wanted to color the background with a gold tone which varies from dark gold, almost black, at the top, to pale gold at the bottom. To do this, he first loaded the paths for the foreground figures, which he had created and saved earlier, and then used the Inverse command to flip the selection from the figures to everything-but-the-figures. Then, with the background selected, he used the Color Balance dialog box to change the color levels until he achieved the midrange gold tone he wanted ❼. Next Day used the selection outline to create a mask for the background and colored the mask with a gradation that varies from white at the top to black at the bottom. White areas of a mask allow changes to be applied to the image under them, while black areas protect the image. With a gradation in the mask, changes are applied on a percentage basis, depending upon the percentage of black in each area of the mask ❽.

With the graduated mask applied to the image, Day used the Levels control to darken

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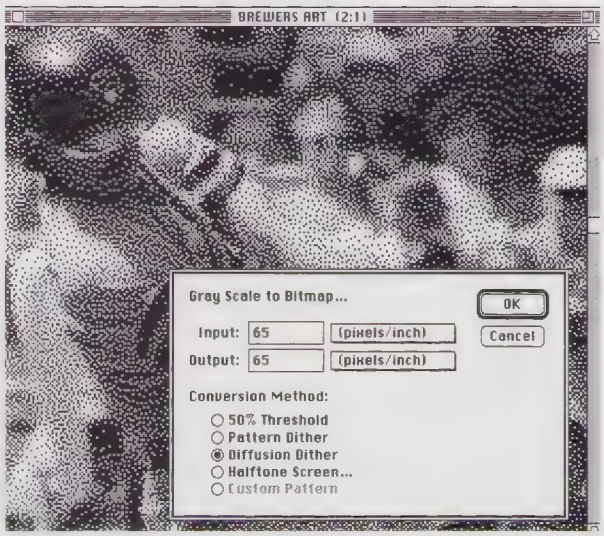

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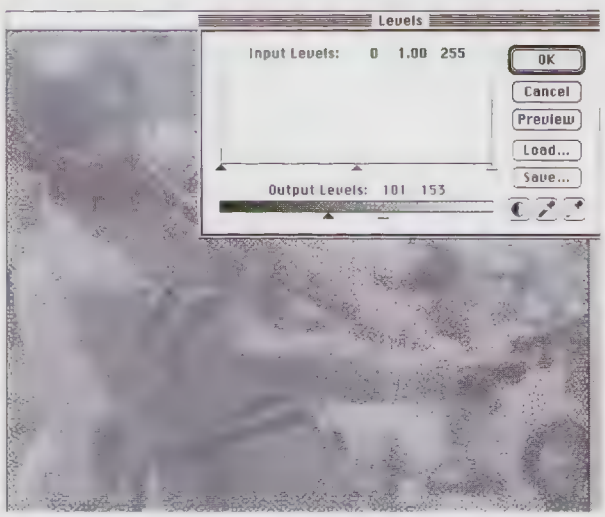

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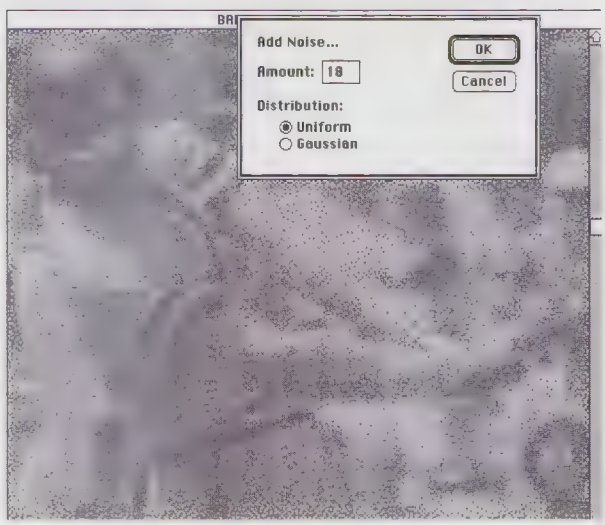

4 By converting the grayscale image to bitmap mode, Day caused the gray-valued pixels to be converted to either black or white. By applying a Diffusion Dither, this conversion was done in a way that produced a grainy, film-like texture. The bitmap was then converted back to grayscale mode and then to RGB mode for coloring.

5 The Output Levels slider controls at the bottom of the Levels dialog box are used to decrease the contrast of the shadows (left slider) and highlights (right slider) of the image. Moving the levels closer together, in effect, decreases the range of light and dark values across the image, thus reducing contrast by lightening the shadows and darkening the highlights. This operation added some gray values to the image, which had before been composed only of black and white.

6 The Add Noise filter randomly changes the color or gray value of some pixels to slightly blur or add texture to an area. By applying this filter, Day produced a texture similar to a mezzotint. Some of the gray pixels of the image were randomly changed to values of red, green and blue.

7 Because the color correction tools work interactively, Day was able to watch the color in the image change as he moved the sliders in the dialog box. This made it possible to adjust color intuitively until he saw what he wanted. The color changes are applied to the gray or colored pixels in the image, while the black pixels remain the same.

8 Day used the Save Selection command from Select menu to save the selected background as an alpha channel (an 8-bit grayscale channel used for holding masks and grayscale information about the RGB image). Working in the alpha channel, he added a black-to-white blend to the mask area (using the blend tool) and added noise to help eliminate banding.

9 Returning to the RGB image, Day chose Load Selection to activate the mask, then used the Levels control to darken the selected area. The amount of darkening applied to the background varies from top to bottom with the degree of black in the mask. This combination of mask and color produced a graduated black-to-gold fill.

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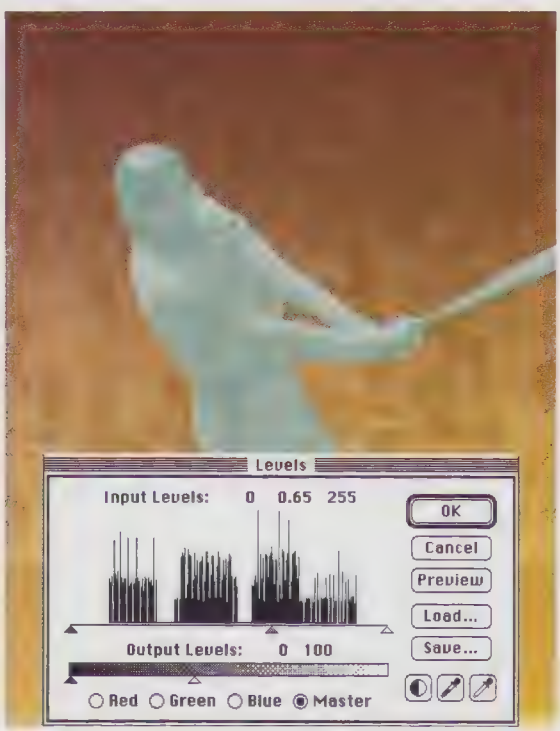

the entire background. Because of the interaction with the mask, the darkening is greatest toward the top of the image and lightest toward the bottom, giving the appearance of a graduated black-to-gold fill running through the grayscale image of the background area ❾.

PAINTING THE FIGURES

Day again used the previously saved selection paths and the color balance controls to select and add an overall color to each of the figures. He then used the lasso tool to select portions of each figure to which he wanted to add different colors. For example, Day applied an overall blue tone to the batter, then selected his face and arms separately and applied a pinkish flesh tone ❿.

In addition to adding color, Day wanted to add light and dark highlights to create a more dramatic look. So as each smaller selection area was filled with the color he wanted, he went on to select and edit detail areas within it. This involved some tricky selection techniques using the lasso tool to get the effects he wanted. For example, to apply color to the face and arms of the batter, Day had first used the lasso to draw around each of these areas, holding down the Shift key to add the three areas into a single active selection. At this point there was no feather applied to the lasso tool, so the selection outlines it drew were crisp and clean.

After editing the color balance in these areas, he then specified a five pixel feather for the lasso tool, which would be applied to all subsequent outlines drawn with the tool. He now used the lasso with the Command key held down to select and delete areas of the total selection until only the highlight areas of the face and arms remained selected. He used the Levels control to lighten these specific areas, and this lightening was smoothed into the adjacent interior areas to a depth of five pixels, without disturbing the cleaner edges between the face and arm shapes and their respective backgrounds ⓫. Using this process of selection for coloring and lightening on all the figures, it took about five hours to complete the color image. *Tip: Another way to "paint" a grayscale image is to apply "color only" paint with one of the painting tools. This will add color to the image without affecting the grayscale information, much like adding a tint overlay. Day could have used this method, but has found that the color changes affected by "color only" paint are less precise and predictable than with the Levels control.*

A STICKER IN ILLUSTRATOR

Virginia Evans used Adobe Illustrator to design, draw and add color to a sticker which would serve as a focal point and background for each book cover's title typography. For the Milwaukee Brewers cover, the sticker takes the form of a ticket. The finished EPS file was imported into the Photoshop image file, where it was color-corrected and given a texture. But since Day wanted the sticker to have a finer resolution than that of the surrounding image, before importing Evans' sticker file, he doubled the resolution of the photo image file by increasing it to 130 dpi. By also specifying that the image size remain the same, and by specifying Nearest Neighbor as the interpolation method, the increase in resolution did not change the appearance of the coarse texture he had already applied. Instead, each pixel in the original image was now represented by a block of four adjacent, same-color pixels. But any further additions or changes to the image would be rendered at the higher, finer resolution. Day used the Place command to import the Illustrator sticker, which was rendered into the image at 130 dpi with anti-aliasing ⓬.

ADDING POSTSCRIPT TYPE

The finished Photoshop image was converted from RGB mode to CMYK mode and saved as an EPS file. The EPS file was imported into Illustrator, where the typography was added for the title and author. Illustrator was also used to create the rectangular backgrounds for the type on the back cover and spine.

Day usually shoots a slide directly from the screen to show the clients as a proof. He's found that the poor quality of most color printers can frighten some non-computer-literate clients into thinking that the low resolution, poor color and dithering patterns they see on a proof reflect what the final output will look like. After approval by the art director and client, plate-ready color separations were printed from the Illustrator file through Adobe Separator. *Tip: Adobe Separator is a utility for four-color reproduction that is included with Adobe Illustrator and Photoshop software.* ■

Janet Ashford is a writer and graphic designer who works in Solana Beach, Calif. She is coauthor of The Verbum Book of PostScript Illustration.

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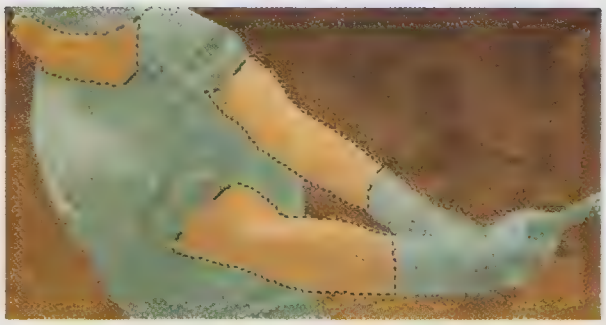

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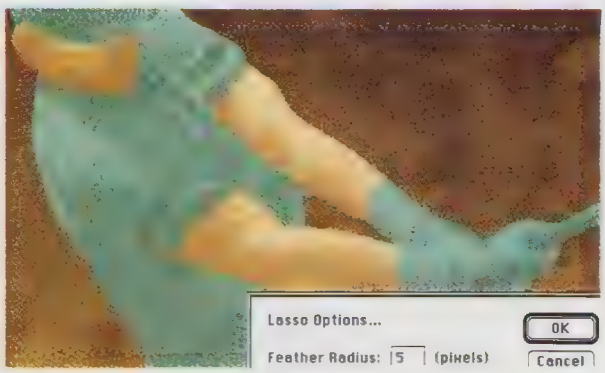

⓬

10 To add color to the figures, Day used his previously saved figure outlines to select and edit the color balance for these areas, without affecting the background. Then he used the lasso tool to select detail areas of the figures for further color editing. For example, Day applied a blue tone to the batter, then separately selected his face and arms to apply a pinkish flesh tone.

11 To add more dramatic lighting to the figures, Day selected highlight areas, for example, on the arms of the batter, and used the Levels control to brighten them. The selection areas were lightened to a depth of five pixels so that the highlights blended smoothly into the darker areas of the arms, without a hard edge between the two areas.

12 A sticker design created in Illustrator was imported into the Photoshop file, which had been resampled at 130 dpi. Day used the Add Noise filter to give the sticker a texture and used the color correction tools to make its colors harmonize with those of the rest of the image.

Turning Photos Into Illustrations: The Art of Autotracing

Fast and creative techniques for turning scanned images into illustrations.

By Simon Tuckett

When dropping a scanned photo into a layout won't produce the effect you want, consider autotracing the shot instead. This article will show you how to transform a photo or illustration into a wholly new graphic using autotracing programs, image-editing and PostScript illustration programs.

CHOOSING THE SHOT

The first part of the autotracing process is selecting the photo or art. Choose a piece which has a good range of tonal values as well as strong shapes. Since the autotracing process will downgrade (or at least alter) the original image, its contents should be instantly recognizable.

Anything can be autotraced. It need not be a photographic original. Actual product boxes, if they fit on the scanner, will work. Once again, clean originals work best. However, an autotrace of an old version of a logo is often a poor substitute for a new one drawn with the tools available in a drawing program. Autotrace applications will sometimes overlook subtle nuances and leave muddy or rounded corners where they should be sharp. Nor will they automatically calculate the best way to render a logo with color separation in mind. Use a logo autotrace only as a template for redrawing the real thing.

IMAGE FORMATS Before anything is scanned or autotraced, it's important to understand the different types of image files scanners produce. For our purposes, we will deal with only two types: TIFF (Tag Image File Format) and RIFF (Raster Image File Format). TIFF is a standard extensively supported by Aldus products which supports varying levels of gray from two to 256. RIFF is the proprietary Letraset standard for image files which retain data for up to 256 levels of gray.

A 256 grayscale file is technically referred to as an 8-bit image. Black-and-white files are referred to as 1-bit files, which means that they require one bit of information to describe the value of each pixel. In this article, we will concentrate on the the autotracing process for 8-bit images.

SCANNING To begin, scan the original illustration and save the scan in any grayscale file format with which you are familiar and which can be opened with a grayscale image-editing application, such as ImageStudio or Digital Darkroom ❶. Because the image will eventually become an illustration, it need not be scanned at a high resolution, just high enough to pick up some of the photo's detail. For example, the 5 x 7-inch shot of the house shown in this article's examples was scanned at 150 dpi; this produced sufficient information for autotracing later. Larger scans take longer to work with and you might catch yourself manipulating details that won't be visible in the final.

POSTERIZATION With the scan on screen in a grayscale image editing application, you can start manipulating the image. Try posterizing to eight shades of gray. First let the computer do the posterization and then manipulate the graymap by drawing new values in the graph-like graymap window. Each click and drag in the window will assign new values to the image on screen. In this way you will be able to see just what value enhancements you can add to those the computer has produced. Sky too dark? Select that area only and lighten it, then reposterize. Do not apply the posterization until you have all the key areas at the values that

❶

1 The original image was scanned on a Howtek Scanmaster color scanner into ColorStudio 1.1 at 150 dpi where it was rather crudely retouched to remove some trees, people and some intrusive clouds. (High-end 24-bit paint programs are far more flexible environments for retouching than black-and-white editors.) While the scanner and image editing software can be quite forgiving when it comes to exposure, you will save yourself some hassle by starting out with a good original.

you like. In the house illustration, I chose to modify the posterization slightly by removing the second level of gray almost entirely ❷. Then apply the posterization and save the image as a grayscale TIFF.

Tip: When all you have is a poor or out-of-focus original to work with, posterization can be a handy remedy. Posterizing has a tendency to delineate different areas of a single image, and autotracing of the posterization permits further editing. This technique can help to suggest good focus in a shot when none exists.

AUTOTRACING

Setting up for a grayscale autotrace in the current version of Adobe Streamline (2.0) is a bit repetitive. Get into the habit of setting each session the same way. Only when you are entirely familiar with the process should you begin to branch out, experimenting with different settings. *Tip: The program doesn't save your settings as a new default like other programs do. Rather, it reverts to its own default settings, so be careful about selecting default or you may lose your settings.*

Under the File menu, select Gray to Bitmap, then choose the Posterize (found at the bottom of the dialog box) and 8-level posterization ❸. When the image has been processed, you can watch a real-time display of the autotracing process.

You can cancel the autotrace at any time by typing Command-period (.). I often do this when I realize that it is going to take forever to trace something. The cancel option allows me to go back and downsample the image and then autotrace again. *Tip: Downsampling means low-*

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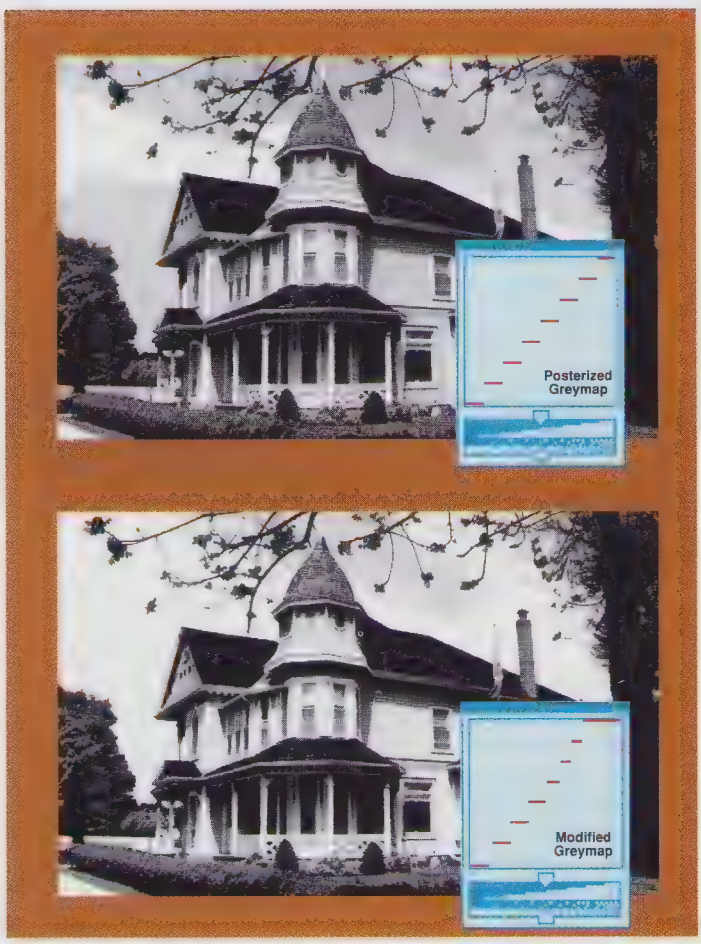

2 Using ImageStudio's Posterize command (on my Mac IIfx with 8mb RAM), I defined the image as having just eight levels of gray. The graph-like graymap window reflected this as eight flat steps. By drawing in the graymap window, I could then modify these steps to produce an improved image on the screen.

3 To generate your autotraced image, under the File menu, select Gray to Bitmap, and then select Posterize and 8-level posterization. Click Convert and select the file you wish to convert through Open File. The computer will do the rest, allowing you to watch the autotracing process on screen. *Tip: You can stop the autotracing process at any time by typing Command-period (.).* The "streamlining" makes two passes, and areas are both filled and stroked.

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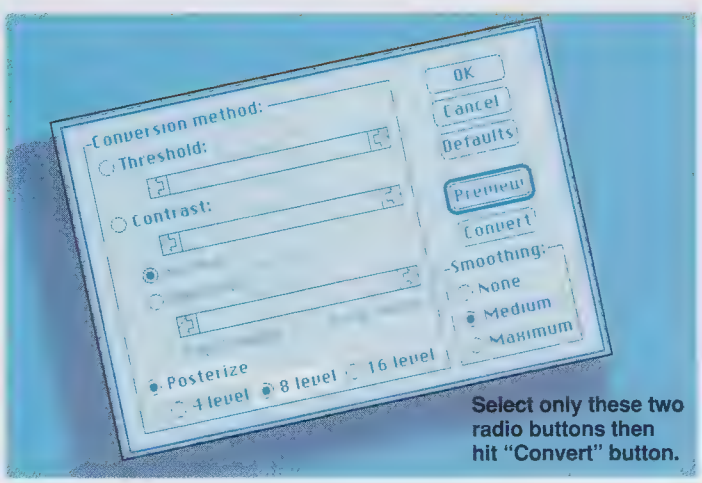


ering the resolution of an image. In ImageStudio, it's simple: Select Open Other and request 50 percent resolution.

During autotracing, Streamline makes two passes at the image. Areas are both filled and stroked and, at present, this is not something you can control in the Setup dialog. The program takes into account the weight of line it is using (this is chosen arbitrarily based on the resolution of the original TIFF file) and butts that up against the line of the next filled area. On a very low resolution file, this produces a blippy, almost impressionist-like image.

Even if you are doubtful about the quality of the image you see building on the screen, stay with it. The on-screen image is much worse than the one you finally end up with in your drawing program. "Streamlining" takes awhile, so be patient.

ON RESOLUTION

Choosing your original resolution has a rather substantial effect on the resulting file size ❹. High resolution autotrace files have long, complicated paths. While Illustrator may be able to open such files, high resolution printers may not be able to output them. Current PostScript printers have a specific limit on the complexity of a path they can render. If a path in an illustration exceeds that limit, the device will not be able to image it. The quickest way around the problem is to split the paths into smaller chunks. You can do this by setting the resolution of your imagesetter in the Preferences dialog box. Later, if you import the image into FreeHand, you may want to keep the paths unsplit; the program will split the paths in the EPS files it creates. However, if the paths are particularly complicated, FreeHand may choke during the conversion from Illustrator: It limits you to a path of no more than 1,000 points. If this happens, you will definitely have to split the paths in Illustrator.

EMBELLISHING YOUR TRACING

Once you have the work in your drawing program you can embellish the artwork, changing a few colors or revamping the entire color scheme. You may find it helpful to "style sheet" all the grays first, however ❺. (See the sidebar, "Drawing in a Word Processor," for instructions.)

APPLY LINESCREEN FIRST

Another variation on changing the color scheme is to scan your image, manipulate the values to your satisfaction and in ImageStudio, for example, apply a horizontal linescreen to the image ❻. Save this as a TIFF and autotrace the resulting file. Because of the rounding errors produced by the program, you will find that the final is quite different from a grayscale TIFF which has had a horizontal linescreen applied directly to it ❼.

However, there are disadvantages to these techniques. Your files may be huge, and you will not be able to apply color to individual parts of the image unless they are independent of the rest of the image.

You don't have to stick with linescreens either. Dots work well, too, even though they produce considerably larger files. If you have the time, experiment using downsampled versions of the file at one-half or one-quarter size. Try a few different screens and a few different settings in Streamline. Then apply the one you like best to the main file. You may even like the coarse effect produced by using the small file, and your hard disk will love you for it.

OTHER PROGRAMS

Different programs have different types of autotraced lines. The line quality varies with each program and each setting. It's a good idea to test the capabilities of the autotrace tool in each program you have and decide which is best for you. While Adobe Streamline may produce an image which is relatively faithful to the original linework, you may find that the aberrations introduced in one of the other applications adds to the mood of the image you are creating ❽. Streamline is perhaps the most flexible of the prime autotracing applications. I must confess to never getting as good an autotrace as those described in the program's manual, but the application is so flexible and controllable that one can always find better settings for the tracing of a particular scan. That's

TIMESAVING TIP:

There was a time when most of the impressive illustration done on the Mac was actually generated entirely by keystrokes. Before the days of Illustrator and FreeHand, the drawing programs were so limited that anything sophisticated had to be written in PostScript code.

Today, Adobe Illustrator files can be *edited* in a word processing program. This may not seem significant until you have spent many hours with an Adobe Streamline file, painstakingly selecting each element individually and changing all the gray attributes to the desired colors. By editing the file in a word processing application first, the color values in the entire piece of art can be manipulated with just one visit to Illustrator's Custom Color menu.

Here's how to do it. First, create your Streamline file as described in the main article. Then open it up in a word processing application like Microsoft Word. Your goal is to search for every occasion where a gray value is described and replace it with the description of a Custom Color.

Use the Search and Replace strings appropriate to your particular type of file—4, 8 or 16 posterized shades. (See the chart at right. Input the chart you will be using into a new file exactly as you see it here. From here you can copy the Search and Replace strings.) First take the search string (the lines ending with "g's") and paste them into the Search For part of the Change dialog box. Then paste the second two lines (ending with "x's") into Replace With. Make sure these are keyboarded correctly with spaces and carriage returns intact. Activate the window for the text of the Streamline file. Now hit Replace All and let the computer do its thing. Enter the second set of lines ending with "g's" into the Search For line, commencing the cycle again. Repeat the procedure for each shade of gray in your autotraced file. Save the file as Text Only under a new title (never destroy your original!).

After the Search and Replaces are complete, Save and Close the file. Open it up in Adobe Illustrator 3.0; you should be able to go straight to the Custom Color menu to start changing the values. If the process didn't work, you may have to go back to the original file, make another copy and redo the Search and Replace, this time doublechecking the accuracy of your keystrokes.

You will also find upon your return to Adobe Illustrator that Streamline threw in some numbered Custom Colors of its own. You don't need to keep these; they can be removed without affecting the illustration. *Tip: In FreeHand, you would use EPS Exchange, a utility from Altsys for exporting FreeHand art to Illustrator, to save your file in Illustrator format and export it to your word processor for editing.*

the real trick to working with Streamline: finding some settings that work for you and then sticking with them, branching out into other settings only when you know what to expect.

AUTOTRACING IN ILLUSTRATOR

This program's autotrace feature is quite controllable, but it only works with Paint or PICT images, which is rather restrictive. However, if you can get a good paint image as your template, you will be able to perform some relatively accurate traces. The best thing about the Illustrator autotrace feature is that you get to choose which lines to autotrace, one after another. This tool is much slower than Streamline, but you will have a human mind at the controls, choosing which line to trace instead of Streamline's "I'll trace anything" attitude.

AUTOTRACING IN FREEHAND

FreeHand's autotrace tool could be the most esoteric. I have the

DRAWING IN A WORD PROCESSOR

Four shades of gray Streamline file

1. First replace...	2. Then replace...	3. Then replace...	4. Then replace...
0.88 g 0.88 G	0.62 g 0.62 G	0.37 g 0.37 G	0.13 g 0.13 G
with...	with...	with...	with...
0 0 0 0.12 (12% Value) 0 x 0 0 0 0.12 (12% Value) 0 X	0 0 0 0.38 (38% Value) 0 x 0 0 0 0.38 (38% Value) 0 X	0 0 0 0.63 (63% Value) 0 x 0 0 0 0.63 (63% Value) 0 X	0 0 0 0.87 (87% Value) 0 x 0 0 0 0.87 (87% Value) 0 X

Eight shades of gray Streamline file

1. First replace...	3. Then replace...	5. Then replace...	7. Then replace...
0.94 g 0.94 G	0.69 g 0.69 G	0.44 g 0.44 G	0.19 g 0.19 G
with...	with...	with...	with...
0 0 0 0.06 (6% Value) 0 x 0 0 0 0.06 (6% Value) 0 X	0 0 0 0.31 (31% Value) 0 x 0 0 0 0.31 (31% Value) 0 X	0 0 0 0.56 (56% Value) 0 x 0 0 0 0.56 (56% Value) 0 X	0 0 0 0.81 (81% Value) 0 x 0 0 0 0.81 (81% Value) 0 X

2. Then replace...	4. Then replace...	6. Then replace...	8. Then replace...
0.81 g 0.81 G	0.56 g 0.56 G	0.31 g 0.31 G	0.06 g 0.06 G
with...	with...	with...	with...
0 0 0 0.19 (19% Value) 0 x 0 0 0 0.19 (19% Value) 0 X	0 0 0 0.44 (44% Value) 0 x 0 0 0 0.44 (44% Value) 0 X	0 0 0 0.69 (69% Value) 0 x 0 0 0 0.69 (69% Value) 0 X	0 0 0 0.94 (94% Value) 0 x 0 0 0 0.94 (94% Value) 0 X

Sixteen shades of gray Streamline file

1. First replace...	5. Then replace...	9. Then replace...	13. Then replace...
0.97 g 0.97 G	0.72 g 0.72 G	0.47 g 0.47 G	0.22 g 0.22 G
with...	with...	with...	with...
0 0 0 0.03 (3% Value) 0 x 0 0 0 0.03 (3% Value) 0 X	0 0 0 0.28 (28% Value) 0 x 0 0 0 0.28 (28% Value) 0 X	0 0 0 0.53 (53% Value) 0 x 0 0 0 0.53 (53% Value) 0 X	0 0 0 0.78 (78% Value) 0 x 0 0 0 0.78 (78% Value) 0 X

2. Then replace...	6. Then replace...	10. Then replace...	14. Then replace...
0.91 g 0.91 G	0.66 g 0.66 G	0.41 g 0.41 G	0.16 g 0.16 G
with...	with...	with...	with...
0 0 0 0.09 (9% Value) 0 x 0 0 0 0.09 (9% Value) 0 X	0 0 0 0.34 (34% Value) 0 x 0 0 0 0.34 (34% Value) 0 X	0 0 0 0.59 (59% Value) 0 x 0 0 0 0.59 (59% Value) 0 X	0 0 0 0.84 (84% Value) 0 x 0 0 0 0.84 (84% Value) 0 X

3. Then replace...	7. Then replace...	11. Then replace...	15. Then replace...
0.84 g 0.84 G	0.59 g 0.59 G	0.34 g 0.34 G	0.09 g 0.09 G
with...	with...	with...	with...
0 0 0 0.16 (16% Value) 0 x 0 0 0 0.16 (16% Value) 0 X	0 0 0 0.41 (41% Value) 0 x 0 0 0 0.41 (41% Value) 0 X	0 0 0 0.66 (66% Value) 0 x 0 0 0 0.66 (66% Value) 0 X	0 0 0 0.91 (91% Value) 0 x 0 0 0 0.91 (91% Value) 0 X

4. Then replace...	8. Then replace...	12. Then replace...	16. Then replace...
0.78 g 0.78 G	0.53 g 0.53 G	0.28 g 0.28 G	0.03 g 0.03 G
with...	with...	with...	with...
0 0 0 0.22 (22% Value) 0 x 0 0 0 0.22 (22% Value) 0 X	0 0 0 0.47 (47% Value) 0 x 0 0 0 0.47 (47% Value) 0 X	0 0 0 0.72 (72% Value) 0 x 0 0 0 0.72 (72% Value) 0 X	0 0 0 0.97 (97% Value) 0 x 0 0 0 0.97 (97% Value) 0 X

most difficulty predicting what this program will do to an imported TIFF. While you cannot define individual lines that you want the application to autotrace, it does allow you to trace grayscale TIFFs. The key to getting the most out of this feature is in resetting the graymap so it reflects just one level of gray in the image, tracing it and then resetting the graymap again before starting another trace. By judicious use of the Layer command, you can quickly build a posterized and autotraced file that will reflect the original halftone image. Sure, it will look posterized, but it will also have a quality that goes beyond the look of just posterizing a scan file alone.

FINAL GUIDELINES

Here are some final tips to make autotracing run more smoothly.

- Keep the scanned file resolution low. You will be surprised at how little detail is needed.
- Do a dummy run-through on a downsampled version of the image. This will enable you to test the Custom Color replacements, new color schemes and the whole process before you do the real thing. The less time you spend back-tracking, the more time you will have for the real work of illustration. This will also provide you with something you can drop into early versions of the layouts.
- Split paths at the appropriate point. It is more difficult to colorize a scanned file, for example, if it has been split into a bunch of smaller paths. You are better off defining colors and other object properties first, and then, just before saving your final file, check the Split Path command in the Preferences dialog box. You may find it prudent to save an unsplit version of the file; if you change some of the properties later, there will be fewer paths to change. Those using FreeHand needn't worry about this because FreeHand chops up the EPS file paths, not the original file.
- Define all objects as having named colors, using Custom Colors in Illustrator or the Color Style Sheets in FreeHand. Autotraced paths are a pain to select; you may accidently be selecting other things as well, so the less rooting around in the art with the pointer tool, the better.

It may seem obvious to say this but the more things you autotrace, the more you will develop an ability to look at a photographic image and predict the results. While you may never be able to predict the results entirely, you can narrow them down so that those magic things that happen to make the illustration that little bit different will be within your control. ■

Simon Tuckett is director of Creative Services for RoboShop Design Ltd., a Toronto-based electronic studio which uses the Mac to produce graphic design.

4

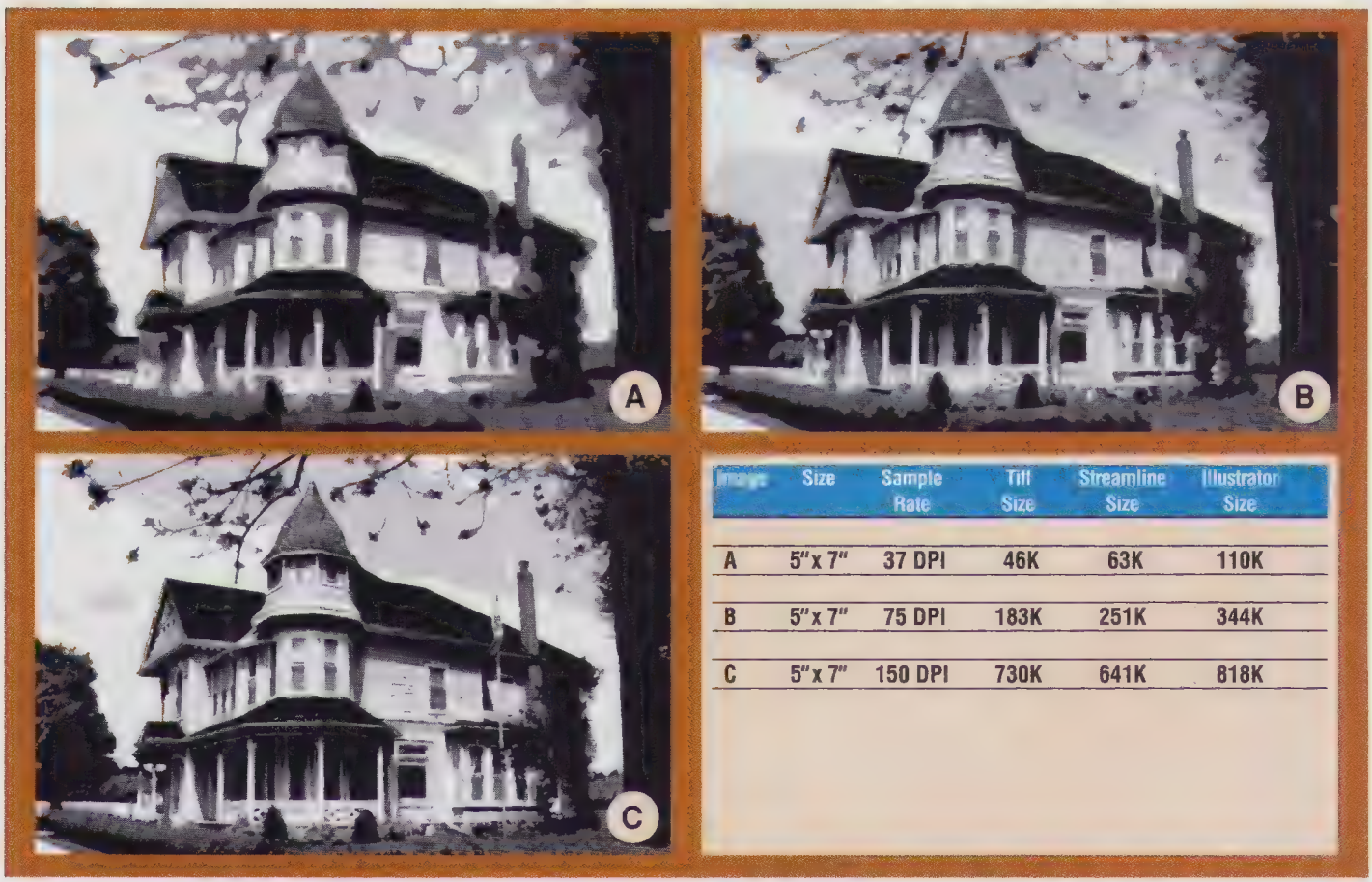
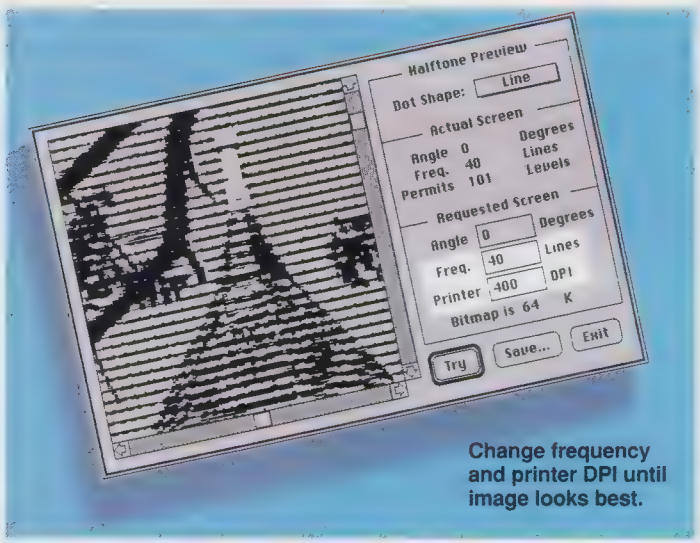


Image	Size	Sample Rate	Tiff Size	Streamline Size	Illustrator Size
A	5"x 7"	37 DPI	46K	63K	110K
B	5"x 7"	75 DPI	183K	251K	344K
C	5"x 7"	150 DPI	730K	641K	818K

4 The original scan resolution can play a large part in determining what the final image will look like. Each image was autotraced from a different grayscale TIFF. Apart from the style differences between A and C, there are time and disk space considerations. An autotrace at 150 dpi will not only take more time to autotrace, edit, proof and output, it will also occupy up to eight times the disk space used by Figure A scanned at 37 dpi.

5

6



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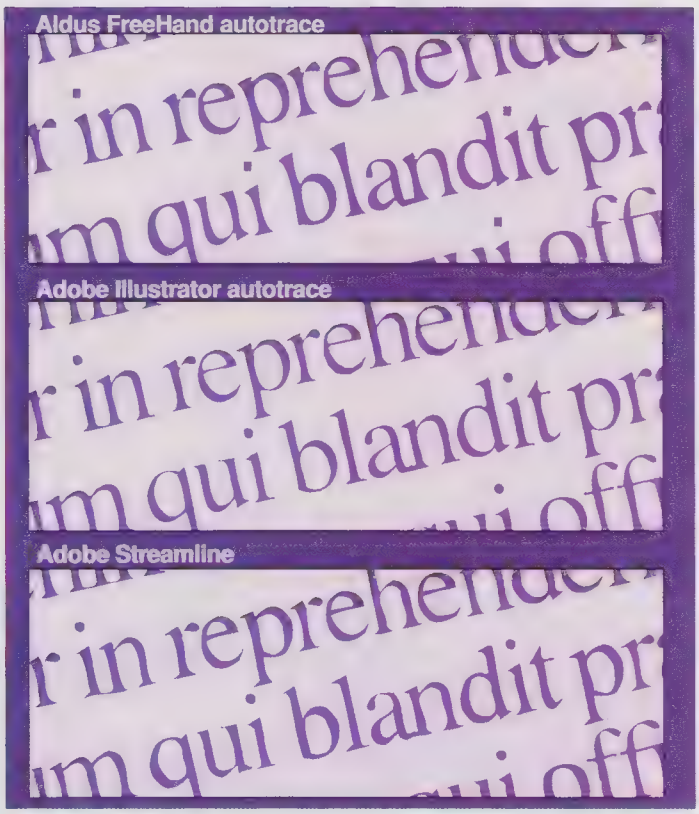
8



5 Custom Colors for each of the levels of gray are created in a word processing program. The file is then opened in Adobe Illustrator and the Custom Colors are redefined. Each level of gray changes to the new color as the Custom Color definitions are edited. (See sidebar on previous spread.)

6 The Halftone Preview in ImageStudio can be used to save an autotraceable TIFF bitmap file. Use the top menu to select lines or dots and then play with the halftone screen and printer dpi settings to produce an image that displays some of the details in the image. Save the file and then exit.

7 Applying a plain horizontal linescreen to an image maintains the photographic quality of the image (left). Saving a linescreened TIFF from ImageStudio and then tracing it produces something far less clinical, more like a woodcut (right). The advantage is that you can color the blacks and whites independently.

8 Each program's autotracing tool reflects a slightly different style. Naturally, this may not be readily apparent if your original is large enough. However, working on small artwork, the autotrace tool is more likely to have an effect on the style of the illustration. Here the same PICT file was autotraced in FreeHand, Illustrator and Streamline.

Artists Put 'Pressure' On For Greater Tactile Control

How six very different artists are illustrating with pressure-sensitive tools.

By Lynda Weinman

Most artists have a love-hate relationship with the mouse. They can't live with it and they can't live without it. And until recently, many complained that the alternatives to the mouse—stylus pens and cursors, for example—simply didn't offer the control, or "sensitivity," that a brush or pencil does. But advances in the engineering of some of the new pressure-sensitive tools from Wacom, Kurta and Calcomp—as well as in the software applications that access their features—are yielding tools that many artists report are responding in much the same way a pencil, brush or airbrush might.

Each tablet has its own set of features—from soft and hard nibs and various stylus weights, to "acetate overlay" features for tracing. But all work in much the same way, by communicating to the computer the pressure put on the stylus' tip, as well as its x,y-coordinates on the tablet. Some allow programming so that a single touch can execute a macro. *Tip: A macro is a series of selections or operations that can be assigned to a button on the stylus or on the tablet itself.* Many tablets offer several kinds of pointing devices: cursors, which are similar to but are more precise than mice, and pens, or styluses. Both kinds of devices can be offered in cordless varieties, and in several levels of programmability. Some pens include ink, so you can see how accurately you are tracing an image from a sheet of paper placed on the tablet.

Tablets can provide point-to-point correspondence between their active drawing area and the monitor's screen, so that the on-screen pointer moves to the position that matches any point on the tablet touched by the pointing device. In contrast, some tablets can also operate in a mouse-like fashion, moving the on-screen pointer the same distance and direction that the pen moves, regardless of where the pen touches the tablet.

The Mac and PC programs that support pressure-sensitive tools range from image-editing and paint programs to PostScript illustration, including FreeHand 3.01, Illustrator 3.2 and Photoshop, Fontographer 3.5, Oasis, Painter, Digital Darkroom, ColorStudio, Studio 32, PixelPaint Professional, Canvas, SuperPaint, Lumena and Image-In. The software may respond to increases in pressure by increasing the density of color applied to the illustration, or a stroke may get broader as pressure is increased.

Choosing the right pressure-sensitive tablet and stylus is an important decision, so be sure to experiment with different types before you purchase one. Keep in mind that a tablet's ability to imitate the "feel" of natural media such as paintbrushes, pens or chalk depends on the speed of the computer, the features of the tablet and the ability of the drawing software to make use of pressure-sensitivity. So when you do your comparative testing, work with the computer and software you plan to use with the tablet. And as you experiment, ask yourself these questions:

- Can the pressure required to work the pen be adjusted to a level that is comfortable for you? You may want a range of pressure settings so you can use one to imitate watercolor painting, for example, and another for pencil or pastels.
- Can the tablet "read" the pen's motions through a layer of paper or acetate? This can be important if you plan to use the tablet to trace sketches or other existing drawings.
- Does the system respond, or "track," fast enough? That is, does on-screen "painting" keep up with the motion of the stylus, or does the appearance of the artwork on-screen lag behind your drawing motions? A noticeable delay can destroy the illusion of working with natural media.
- Does the tablet come in a convenient size? Some graphic artists prefer a small tablet that gives a 1:1 ratio between tablet size and the screen or a letter-size page. Others may prefer the greater control that a large tablet provides, even though it takes up more desktop or lap space. Some tablets will allow you to vary the tablet-to-screen mapping; on a relatively large tablet, you can choose to do all your drawing in a small space or to

Creative Sensitivity Using Aldus FreeHand 3.1, the Wacom digitizer tablet and his Mac IIfx, illustrator Don Baker found the cordless, pressure-sensitive stylus allowed him to sketch in a more natural, fluid way as he created the highlights and reflections in the illustration at top opposite (demonstrated in more detail later in this article). Cleo Huggins' pencil drawing (opposite below) was completed using Adobe Photoshop and Painter's (Fractal Design) pressure-sensitive interfaces. Designers at Rucker Huggins liken the drawing process with their Wacom 6 x 9-inch tablet and stylus to learning to drive a stick shift. "Once you know it, you never think about it again."

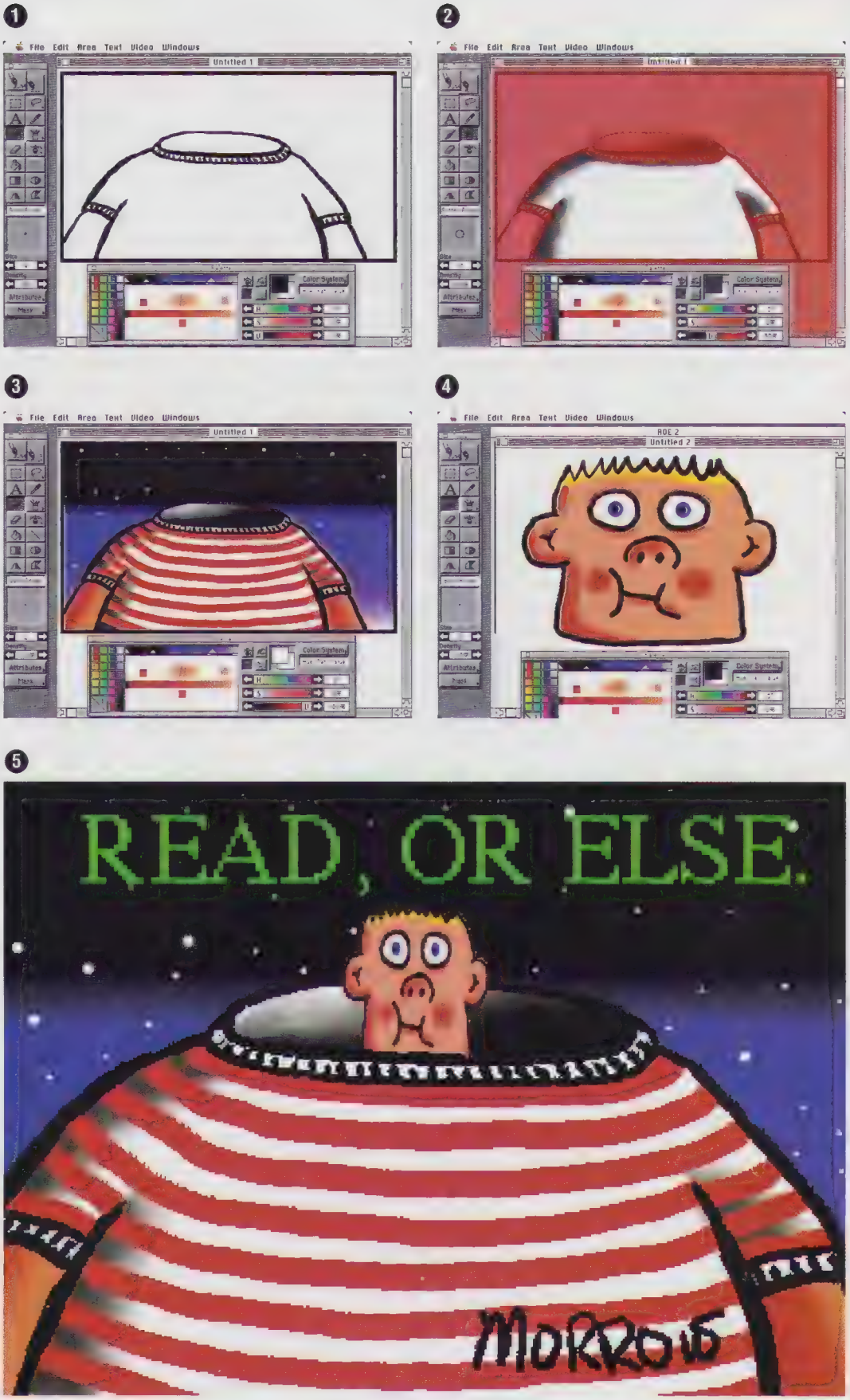
Cartoonist Skip Morrow
1 Working in Oasis with the Kurta tablet and stylus, cartoonist Skip Morrow creates his original linework directly on his Mac II using the solid brush tool. He says the tablet helps him maintain line character.

2 Using the airbrush and soften brush tools, Morrow creates the inside color shading. Both tools are controlled by the amount of pressure Morrow chooses to apply.

3 Next, the artist turns the sky into a mask and applies a gradation to the background. (The mask is created by using the brush as a selection tool.) Morrow first paints a frisket with a custom-sized brush. Returning to the normal paint mode, he selects Mask under Attributes and turns the mask on. The gradation dialog box in Oasis is very powerful, offering an active preview of the gradation that can be changed interactively before initiating the change. You can adjust direction of the fill, the type of fill (radial, linear or fit the shape), number of times it cycles, and the density of the fill, and see the results before committing. He sets up his gradation by dragging colors into the bar, and selecting Gradation fill under the Area menu.

4 Now the color shading is applied to the figure's head with the airbrush tool. In this case, he sets the pressure-sensitivity (under Attributes) to relate to color density.

5 As a final touch, he resizes the head, and cuts and pastes it into the other file with the shirt.



Designer Cleo Huggins
1 Using her Mac IIfx, Cleo Huggins of Rucker Huggins opens a scan of a still-life she shot and crops it to size in Photoshop.

2 First, she converts to grayscale from RGB display mode, which removes all hue information from the image, leaving brightness and saturation values intact. Under the Adjust submenu using the Brightness/Contrast controls, she adjusts the brightness and contrast to soften and fade the image.

3 Next, she opens the adjusted image in Painter and applies a 60 percent non-shiny surface texture to the entire scanned image. *Tip: Choosing Shiny causes the highlights to be exaggerated.* Within the same dialog box for surface texture is the light direction feature, since a light source helps show the paper's texture with highlights. Huggins leaves the setting at the default of 135 degrees.

4 Using the 100 percent default settings for the 2B black pencil, she draws strokes over the image using her Wacom stylus and tablet. (See the opening spread for the final image.)

use an area bigger than the screen in order to get the control and detail you want.

Ultimately, your choice will boil down to which tablet best complements your own style.

To give you an idea of how some artists are using these pressure-sensitive tools, *Step-By-Step* interviewed a cross-section of working illustrators and designers, representing a variety of styles and software programs. Some had used these tools a lot; others, a little. Most found that once they got used to drawing with the stylus, the software interface quickly became more important to them than the drawing tool. In effect, the stylus became transparent, since ultimately it is the software that allows you to achieve the special effects you want. But all agreed that pressure-sensitivity will be essential to creative expression for artists working in the computer age.

PAINT PROGRAMS

CARTOONING Skip Morrow experimented with pressure-sensitivity and Oasis software for the first time in late 1991 as a demo artist at the Seybold Conference. An established illustrator and cartoonist, he is known for his hand-drawn humorous style, which lends itself well to a pressure-sensitive tablet and a stylus. They help him maintain integrity of line, he reports, and as a cartoonist, variable line width is essential.

Since his own studio set-up is limited to an unaccelerated Mac II with laser printer, he suffers from the same equipment "blues" other electronic artists do: "You really need a fast machine to use this technology," he insists. "The flair of the stroke is achieved through the speed with which you lay down a line. Even using the Mac IIfx [with Kurta's new tablet] at the show, I found the response time lagging behind my hand gestures during tight crosshatching."

Morrow has been impressed with Kurta's attempts to understand his needs and tailor the tablets' specifications to meet them. He claims to be their worst critic, as he has very high standards and is not afraid to let them know when something doesn't work to his liking.

After working in PostScript for so long–Morrow routinely laser prints FreeHand files to acetate roughs, then projects onto illustration board for tracing–the cartoonist felt limited by the sterility of the line quality and the predictability of radial fills and mathematical blends. "It's as if in order to work in this medium I had to become a different artist," he recalls. So he is pleased that computer companies are finally responding to artists' needs by offering tools that simulate traditional media.

Particularly pleased with the

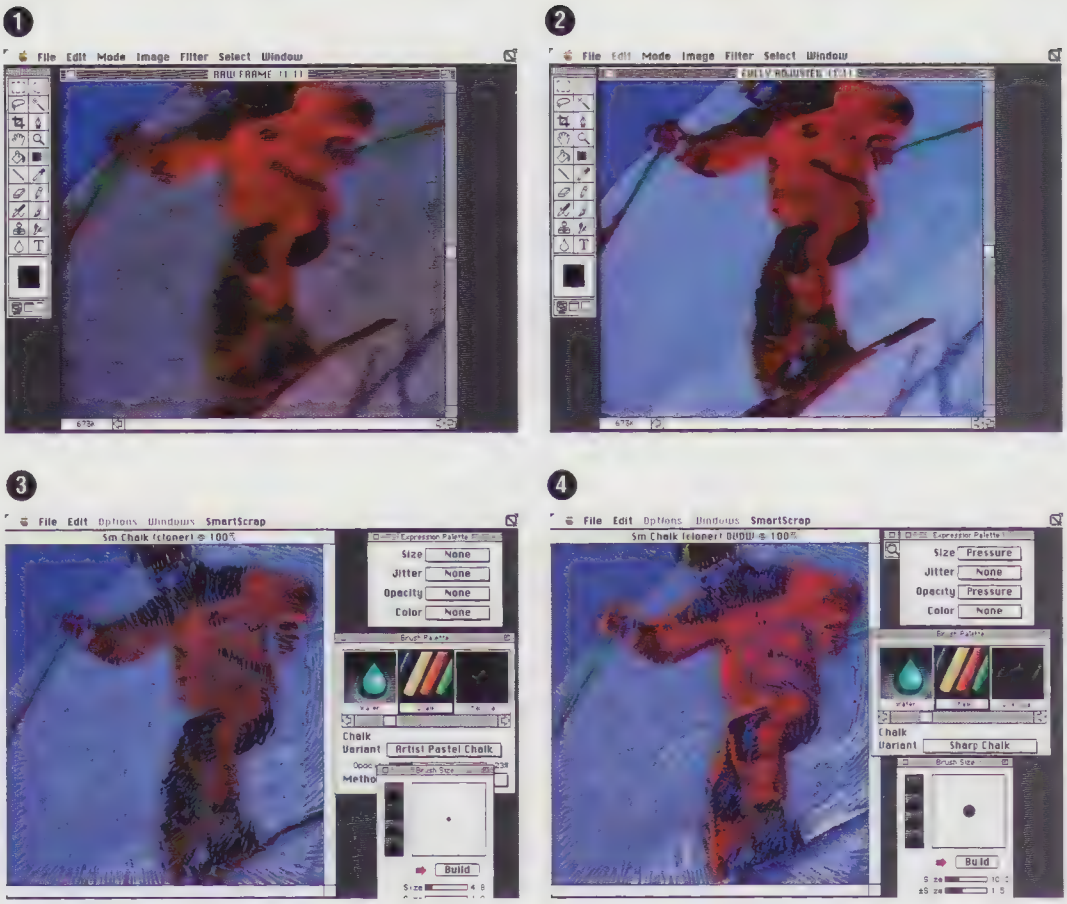
Animator Ann Monn
1 As she demonstrates the process of "rotoscoping" a live-action image, animator and educator Ann Monn explains how she will produce an animated sequence with a hand-drawn painterly quality applied to many frames of video. First, she captures the raw image using a TrueVision NuVista+ board and a consumer-grade half-inch VHS VCR. The footage was running at real-time speed and the image was taken "on the fly."

2 Because her original frame grab was not the best quality, she adjusts the image using Photoshop's Video de-interlace filter; then she adjusts the chroma and color balance. When doing this process over a large number of frames, she recommends using a macro program to automate the repetitive steps.

3 Next, she brings the image into Painter so that she can work with her Wacom 6 x 9-inch tablet and Painter's Tracing Paper feature under the main menu. (The Tracing Paper feature, which can be turned on and off for ease of viewing, is off here.) First Monn makes a copy and colorizes the image with a 50 percent value of cool gray for the background color, instead of the default (which is the white of the paper). An initial application of pastel chalk is also applied.

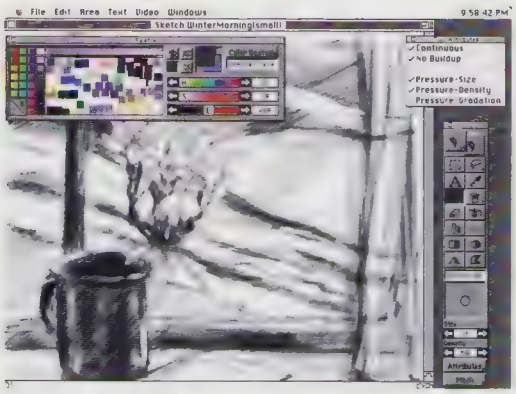
4 Finally, she changes the default settings in the expression palette to emulate traditional painting, so that the size and density of the brush (a sharp piece of chalk in this case) is affected by the amount of pressure she puts on the stylus. The harder she presses, the more opaque the line becomes. Monn keeps adjusting her brush size to emulate blunt or soft-edged pastels.

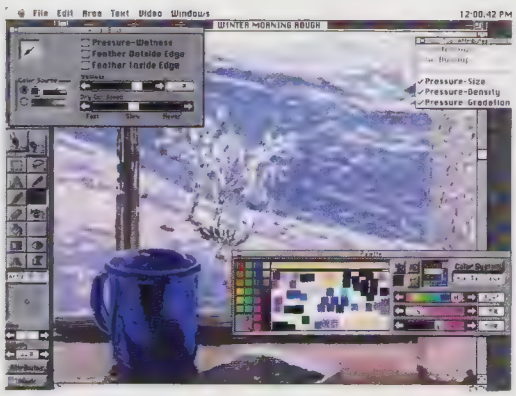
5 Note in the final skier image (at right) how the careful attention to stroke direction gives the image more dynamism.



gradual color blending capabilities in Oasis, Morrow uses the Soften Filter feature often, as it lends that final, natural touch to his illustrations. On the down side, he is frustrated with the program's lack of zoom features and slow speed. *Tip: Time Arts, the makers of Oasis, report that Version 1.1, due out in the first quarter of 1992, will solve these problems.*

CREATING PACKAGING At Mountain View, Calif.-based Rucker Huggins, partners Hal Rucker and Cleo Huggins specialize in graphics for computer industry heavyweights, including NeXT, Adobe and Apple Computer. A recent assignment to create the packaging for Fractal Design's natural media program, Painter, brought with it an opportunity to really test the limits of their Wacom 6 x 9 tablet and stylus, which Rucker and Huggins had already been using for approximately six months.





Illustrator Chelsea Sammel
1 After getting the pencil sketch approved for this *Resolution* magazine cover, Chelsea Sammel starts blocking in basic areas of color using her Calcomp stylus and a brush size of 15 with a rather transparent density of five to 10 percent. Note how she has already mixed a paint palette in Oasis' color management window. This allows her to build color gradually.

2 She is using pressure to control line width, transparency and a gradient color while using the Artist Brush. Note in the gradation bar how she works with a subtle beige to white for the snow-capped mountains. She paints the foreground darker than intended because she wants to achieve an underpainting effect by creating a layer that will show through later.

3 Then the artist scans in, at 300 dpi, a black-and-white 1940s photograph of ice crystals to achieve realism on the window. In Photoshop she inverts the photo so that she can work in black on a white background. Back in Oasis, she opens the Photoshop document (it is saved as a PICT) and working in the Selection mode she paints over the black crystal. Turning Mask to Mask On, she now has an active selection of the ice crystal and copies it into the clipboard using Command-C. Going back to her original document, she uses the Artist Brush and selects Clipboard Brush. Now she can paint with the crystals, and she is able to randomly set this shape down repeatedly. She creates a matrix of organic crystals without having to redraw each component separately. A transparent gradient over the crystals is added using the SuperSelect tool. (This allows selection of areas using the pressure-sensitive brush.) She draws in the curtain, adds the pencil and finally puts in reflections from the mug.

"When you draw a lot with a pen, you learn to pivot the pen with your wrist. You also tend to move the paper around underneath the pen a lot. You can't do either of these things with the computer, unless," quips Rucker, "you want to move the monitor around." He offers this analogy: "It's like learning to drive a stick-shift. Once you know it, you never think about it again."

Now that Huggins is comfortable working with her Wacom tablet on her Mac IIfx, she admits she had long been growing weary of "crude tools like lassos and paintbuckets." She marvels at Painter's abilities to make colors deeper when they overlap, to build up depth—"just like you can with real paint."

As excited as she is about these new natural media tools, though, she will concede to several drawbacks, such as working in high-resolution. "Most of the color work I do is at 300 dpi," she states. "Manipulating these images at those sizes is agonizingly slow. Sometimes I wish I had my own Scitex or Cray!" she jokes. *Tip: Since working at high resolution slows down the response time of the stylus, Painter will compensate for this lag time by indicating a stroke with a dotted line. In this way, you know where you put your stroke down while the system is busy rendering it.*

ANIMATING Like Rucker and Huggins, Mac-based Hollywood animator Ann Monn also uses Wacom's 6 x 9 tablet, usually on her lap. She prefers its soft-tipped pen, and claims she does not have to press down hard, eliminating her concern with carpal tunnel syndrome (CTS) in her wrist. *Tip: CTS, a common type of repetitive strain injury (RSI), gets its name from the carpal tunnel, a small sheath of cartilage in the wrist that acts as a channel for the nerves and tendons that control movement and feeling in your hand. When you routinely apply pressure to those tendons, they can swell up.*

Monn was impressed with Painter's responsiveness to the Wacom tablet and stylus, but she was also overwhelmed by all of the choices available. "It makes me happy," Monn enthuses, "to work with software that is so delicious that it feels as if it could take years to taste all of it."

EDITORIAL ART If anyone could be called a veteran of pressure-sensitive graphics, then Chelsea Sammel has certainly earned that title. Her computer-generated impressionistic art has been featured often in the computer trade press, and she can usually be spotted as a demonstration artist at trade shows.

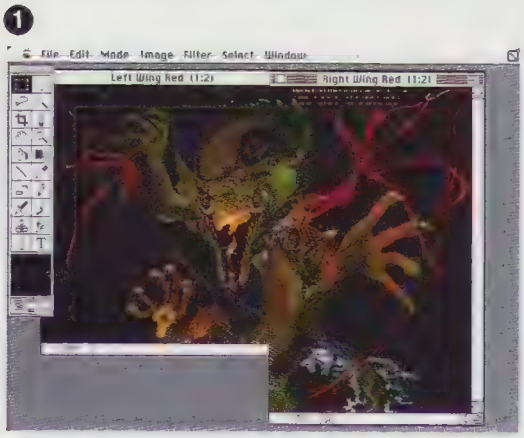
She admits to being "ham-fisted," and holds her pen very close to the tip. So after pro-

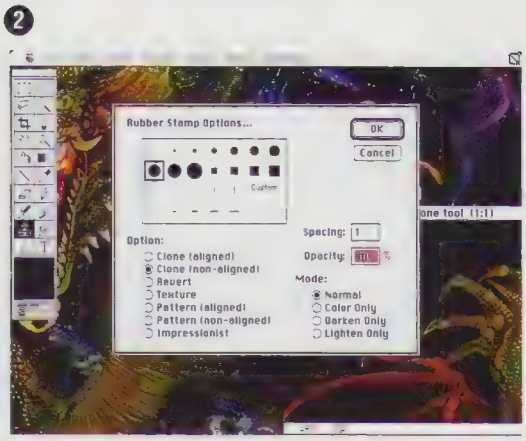
Artist Trici Venola

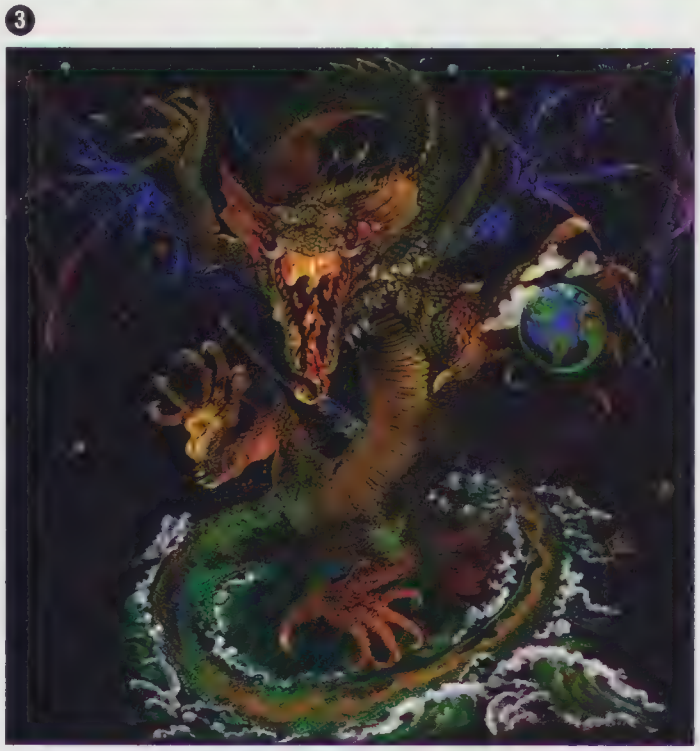
1 Trici Venola reports that the Wacom 12 x 12 tablet sped up her work on this image immeasurably, as every line in this image has thicks and thins, something she would have drawn pixel by pixel without the stylus. In one of a series of "Brazen Images"—paintings, animations and slide shows "in which various deities cavort in a seething darkness" — the dragon's wings were roughed in using Photoshop's solid colors. In order to work at a large scale, yet still have enough memory so as not to slow down too much, she divides the artwork into separate smaller files to combine later.

2 To lay in the subtle texture of the reptilian scales on transparent wings, Venola chooses the clone tool, under Rubber Stamp Options, set to 30 percent, and chooses the "non-aligned" option. Non-aligned clone will cause the source art to begin at the same place every time you place the clone tool.

3 Although Venola believes that Photoshop's pressure-sensitive brush settings are not as varied as those of Painter or Oasis, she works comfortably, even with simple default settings, as she did for this image.







gramming her tablet's stylus switch to "undo," she ultimately turned the "undo" switch off, as she was constantly undoing things without meaning to.

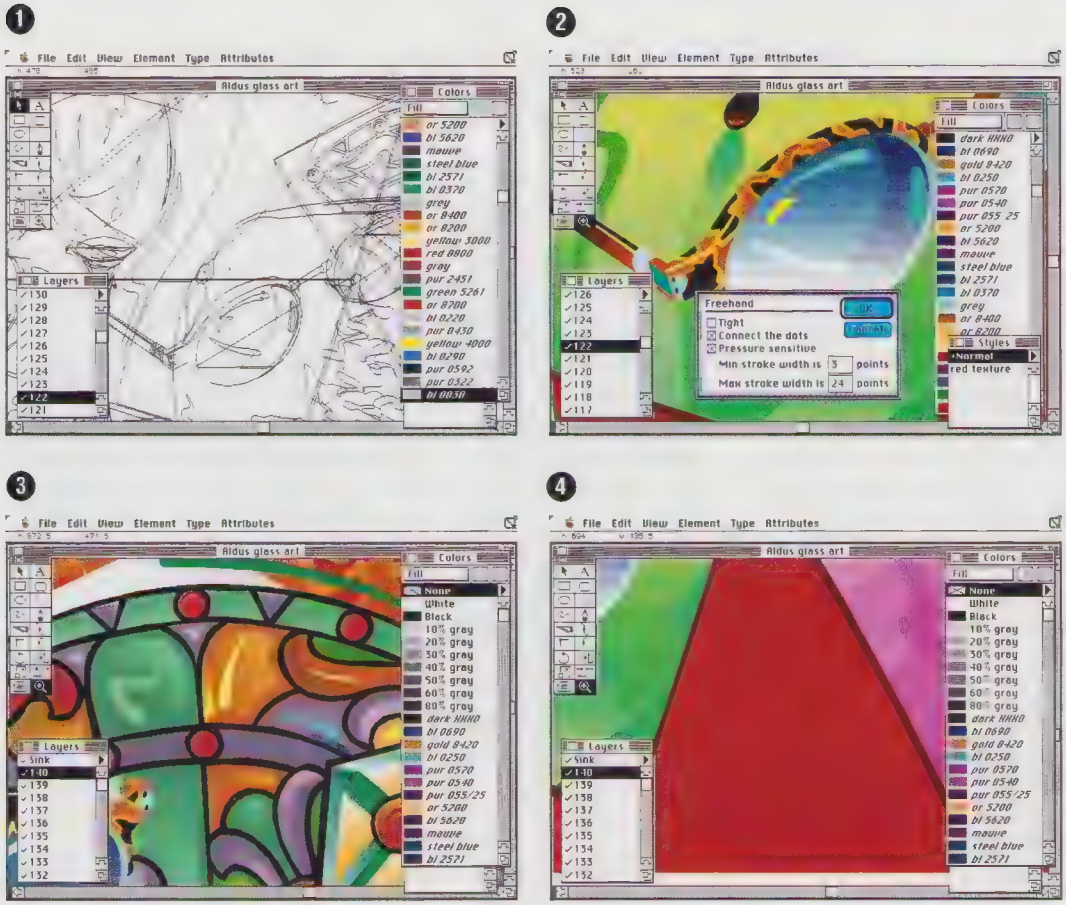
Sammel's studio is outfitted with an unaccelerated Mac II, a 32-bit NuVista card, Calcomp and Wacom tablets and two monitors, one a standard Apple RGB and the other a 19-inch multisync, which allows her to view her images in NTSC format (color standards for TV). She relies on macro keys so she doesn't have to use the keyboard very much. In this way, she can be more involved in the act of painting. She has programmed Undo, Open, Close, and custom Oasis brushes as part of her personalized macro palette. "I am sensitive to the way my pen feels, and even when I'm working with traditional brushes, sometimes I'll add rubberbands to create the right weight." She was pleased with the results when she recently used the clear acetate overlay that comes with her Calcomp tablet, a feature that allows you to trace a drawing into the computer instead of using a scanner. "At the start, I found I had to subjugate myself to the limits of the computer and ended up not working in my style, producing results that felt like they could have been created by anyone. I went back to the basics and analyzed the way I painted on canvas and then forced myself to work the same way on the computer."

Depending on the project, she will use her tablet and stylus with any number of software programs, including Painter, Photoshop and Oasis. For example, in Oasis she values the fact that you can save a palette to the hard disk, and have it there from one illustration to the next. *Tip: This color management feature is also available in other programs, as well.*

IMAGE-EDITING PROGRAMS

'BRAZEN IMAGES' Illustrator Trici Venola has been working on the Mac since the early days of black and white. Her underground comic roots and fascination with mythology continue to make her style and subject matter powerful and compelling. Working in Photoshop with a Wacom 12 x 12 tablet set to full resolution, she often finds it satisfactory to leave all the tools (pencil, airbrush, brush, soften) at their default pressure settings, adjusting only the scale and width of each tool.

The tablet, she says, has sped up her work immeasurably. In order to achieve the appearance of a thick-and-thin line before, she would have to zoom into her art and painstakingly draw a taper, pixel by pixel. "It has



changed the way I work," she claims, "by eliminating a barrier between creating the art and the computer process."

She hardly ever scans source material for reference, and usually begins an illustration by doing her rough sketch on the computer using the Wacom tablet. Venola was pleased to report that it did not take long to learn to use the tablet.

POSTSCRIPT PROGRAMS

SPONTANEOUS LINE Don Baker, a Seattle-based illustrator, works primarily in PostScript illustration programs, and his inventive imagery is featured prominently as part of many FreeHand tutorials and print campaigns.

Hired by Aldus to do the packaging for FreeHand 3.1, he was among the first to sample its pressure-sensitive interface. Baker has perfected a method of making his work appear spontaneous and easy; but as anyone working in PostScript draw programs knows, the seemingly effortless process is actually very precise and controlled.

Using the Wacom tablet with his Mac IIfx for the first time, he reports that it took some mental adjustments to let loose with a level of drawing speed and spontaneity he had long ago abandoned in order to work on the computer. He found the tablet allowed him to sketch in a more natural, fluid way, and he used the stylus for background and accent highlights. *Tip: FreeHand's pressure-sensitive freehand tool lets you thicken line weight simply by pressing down harder on the stylus.*

Although it didn't take him very long to learn how to use the tablet and stylus, he did admit that the process is so different from the way he is accustomed to working with FreeHand that he felt uneasy with the tablet at first. *Tip: If you are a FreeHand 3.1 user but you don't yet own a graphics tablet, you can still access "pressure-sensitivity" by depressing the left bracket as you draw, to slowly reduce your stroke's width; the right bracket increases its weight.*

(Editor's Note: For a more detailed step-by-step demonstration of an image created with pressure-sensitive tools, refer to "Natural Media on the Desktop: Painting With an Electronic Brush.") ■

Lynda Weinman owns a Mac-based animation production company, teaches computer graphics at Art Center College of Design, Center for Creative Imaging and American Film Institute, and offers workshops and lectures on Mac graphics and animation nationwide.

Illustrator Don Baker

1 Seattle-based illustrator Don Baker begins in FreeHand 3.1 by tracing all the shapes in a scan of his pencil sketch. Next, he creates highlights in the glasses using his Wacom stylus pen. *Tip: Because the stylus works by creating two lines connected at the ends with pairs of points along each line, these lines can be edited like any other PostScript points. This gives him controlled variations of line width to suggest the curvature of the lens.* The Layer window shows a list of layers in Baker's illustration. (Checks indicate that these layers are visible.) Color selections are shown in the Colors window.

2 To set the sensitivity range, Baker specifies desired parameters for thick and thin by double-clicking the FreeHand tool and checking the Pressure sensitive box. The degree of pressure-sensitivity is controlled with increments starting at 3 (very spontaneous) to 63 (much slower). For the most part, Baker keeps the setting at 15, which he finds the most even and fluid speed setting. *Tip: You can also set the parameters of thick and thin in pica measurements.*

3 The pen helps Baker capture irregular highlights and reflections in the glass.

4 The background offers Baker an ideal opportunity to achieve a random, organic texture to balance the hard edges of the main elements. He does this by setting his pica parameters for thick and thin and laying in random squiggles where he wants. (See the opening spread for the final image.)

Winning Approaches to Illustration on the PC

How to achieve transparency, extrude for added perspective, and merge type and graphics, as well as other effects.

Competition Winner An homage to Frank Lloyd Wright, designed by Pawel Bodytko, contains more than 1,400 objects, uses process and Pantone colors, and includes a custom-designed typeface.

By Daniel Will-Harris

Creating "see-through" transparency. Using blends to add a feeling of movement. Layering drawn and autotraced elements with bitmaps for soft and hard edges. Combining type and graphics to create interesting black-and-white effects.

These are just some of the many techniques professional illustrators are working with every day, using the ever-growing list of powerful image-editing and illustration applications now available on the PC platform, including Corel Draw, Adobe Illustrator and the recently released Aldus Freehand for Microsoft Windows. *Tip: A new version of Adobe Illustrator for Windows will also be released in 1992.*

No doubt the most popular PC draw program in use today, Corel Draw and its features are showcased every year in an annual design competition highlighting the work of its users. And as a judge of the 1991 contest, I found two finalists who displayed mastery over both software and design, using creative techniques to achieve their illustration goals. This article will focus on a few of their methods, and explain some of the ways Corel's "Combine" function can create interesting positive/negative results.

THE FLW CALENDAR

Perhaps the most inspired (and certainly the most complex) entry was an homage to Frank Lloyd Wright, designed by Pawel Bodytko. (See the illustration above.) This intricate illustration contains more than 1,400 objects, uses process and Pantone colors, and even includes a typeface designed just for the project. A part of Bodytko's Great Artists of the 20th Century calendar series, the illustration took him at least 20 hours to complete. One of the most unusual effects can be found in the Frank Lloyd Wright portrait. The likeness combines a scanned image, traced images and drawn images to create a layered effect that is part realistic, part futuristic.

Bodytko started with a grayscale scanned image of Wright. He edited and manipulated the image in an image-editing program called Gray/FX. Because of his emphasis on color, he wanted to highlight each gray level of the image separately.

To do this, he isolated 30 of the 256 different gray levels, creating, in essence, a limited grayscale separation. Each of these individual gray levels was saved to a monochrome TIFF file. These files were autotraced, one by one, using Corel Trace. *Tip: Corel Trace is a stand-alone tracing program (included with Corel Draw) for the PC that is similar to Adobe Streamline, a program that is available on both the Mac and PC platforms.* Each of these resulting EPS files were then imported into Corel Draw. Because a single original scan had been the basis for all 30 of the traced files, they layered easily, with all the elements aligning.

Tip: Autotraced files often contain paths that are too complex to print on imagesetters. While you can edit them by hand, a new feature in Corel's 2.01 will automatically break paths into smaller pieces for printing when they reach a preset limit. The file Corel Draw contains one section called [CDrawConfig]. Under it, you

will find this line: PSComplexityThreshold=600. The number after the equal sign tells Corel how complex paths can be before it needs to break them. You can set this to any number you want. Keep in mind that breaking paths takes time (each time the file is output), so you don't want to set it unnecessarily low. But there is no standard setting. It all depends on the complexity of your image and your output device. For example, the default setting is 600, but when outputting to a non-PostScript device, such as a LaserMaster 1000 or 1200 plain paper typesetter, you don't need to break paths because it can handle much more complex paths.

Bodytko saved the grayscale image in Gray/FX in a random dithered format (sometimes known as "error-diffusion"), creating a monochrome bitmap file that simulates grayscale, while giving images a computer-generated look ❶.

ACHIEVING TRANSPARENCY One of the more curious, and sometimes frustrating things about PostScript illustration programs is their inability to have "see-through" elements. This is due, in part, to PostScript's inability to describe transparent objects. To create a transparent effect for the final printed piece, Bodytko assigned a process color to the bitmapped portrait in Corel, then selected "Overprint" from the PostScript menu in the color palette ❷, ❸. This option allows you to simulate a "transparent" object when creating color separations. When Corel separates the image, it doesn't block out the objects below the overprint object so they will show through. *Tip: To proof the transparent effect on a laser printer, you could print*

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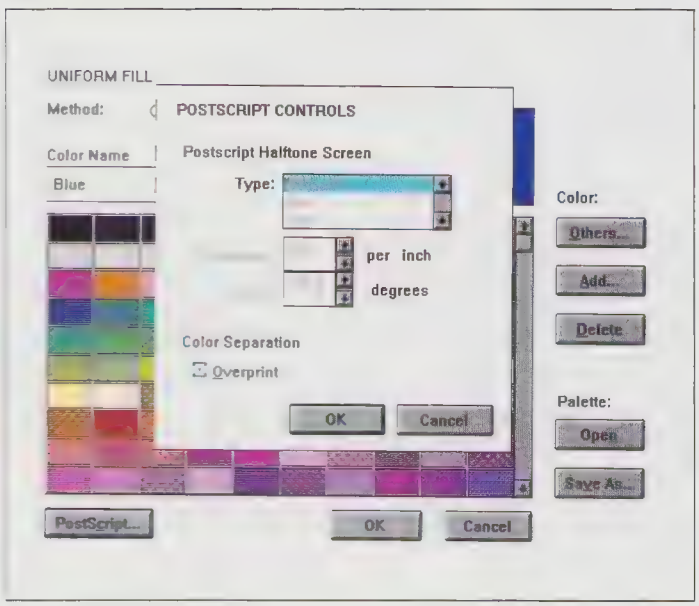

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1 In Gray/FX, Bodytko saved the grayscale image in a random dithered format, also known as error-diffusion, creating a monochrome bitmap file that simulates grayscale, while giving the image a computer-generated look.

2 To create a transparent effect for the final printed piece, Bodytko assigned a process color to the bitmap, then selected "Overprint" from the PostScript menu in the color palette.

3 This on-screen preview shows what the portrait looks like without the overprinted bitmap. You can clearly see the many elements created by autotracing individual gray levels. The results look almost topographic.

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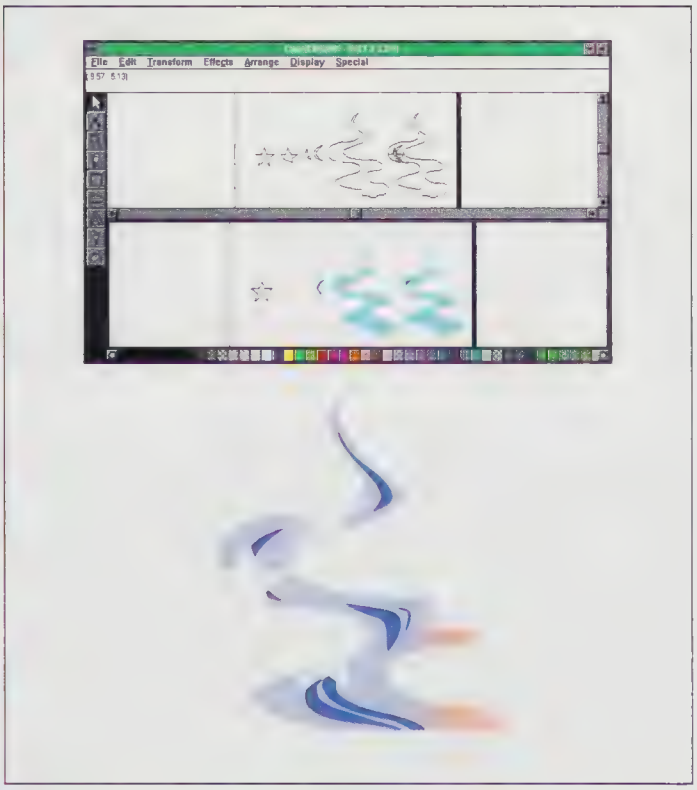

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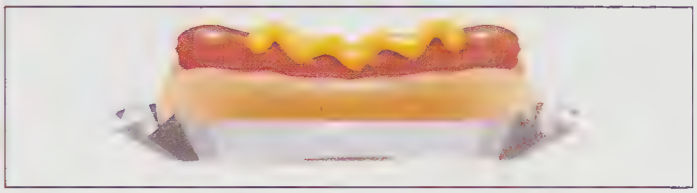

Kathy Orzechowski's patriotic illustration creates the illusion of transparency and motion (above).

4 To create a transparent effect, objects were duplicated, broken apart and reshaped to fit the "steam" shape, then colored with a 30 percent tint of the original color. Here you can see how the individual pieces fit together to give the illusion of transparency.

5 Orzechowski used the blend tool to automatically blend the bun, yet she chose to shade the hot dog manually with the drawing and freehand tools to give it a more irregular, natural look.

one version without the bitmap, then print the bitmap on laser printer transparency stock and lay it over the base art.

EXTRUDING FOR PERSPECTIVE Bodytko created cubist "hair" by drawing rectangles, then using Corel's Extrude tool to add perspective. He then manually edited the extrusions for color and shape. The neon-like effect around the edge of Wright was created by using the blend feature. Bodytko created an object with a dark green, 16-point outline. He then duplicated the object so that the duplicate was placed exactly on top of the original. He changed the outline of the duplicate to .5-point light green and then blended the two objects. Corel created 10 intermediate objects that together created a glowing effect for the outline.

HOT DOG!

What do you get when you mix an American flag, hot dogs and a baseball? Designer Kathy Orzechowski's patriotic illustration, created during the Gulf War. (See the final above.) Two special effects add movement to this still-life: Steam rising from the hot dog, and lines trailing behind the falling baseball.

CREATING THE STEAM Transparency was a major issue in the creation of the steam. Because this was to be output as a slide, it could not rely on overprinting to create a transparent effect. *Tip: There are PostScript as well as non-PostScript film recorders. Non-PostScript film recorders use their own printer drivers which print to film as if they were printing to paper.*

The artist explains: "When you look through steam, the color of the object isn't quite as brilliant, so I had to find a way to lighten particular areas that were viewed through the steam. After much trial and error, I realized that I had to take the original object, duplicate it exactly, edit the duplicate to fit the overall shape of the steam, and then fill it with a lighter shade of the same color." She drew the detail of the steam, then duplicated any objects which would be seen through it. Because it passed over objects in an irregular way, she broke apart each duplicated piece and deleted any nodes that extended outside the steam. Then she reshaped the outside border of the object so that it matched the outside border of the steam ❹. *Tip: Like Adobe Illustrator, Corel Draw allows you to break paths wherever you want. Double-clicking on a path in node-edit mode brings up a Node menu at the cursor, from which you choose Break.*

Orzechowski selected colors using Corel's Pantone color specifications, rather than process colors because it made it easy to select a lighter tint for the steamed objects. If the background was 100 percent, she gave the objects behind the

steam a 30 percent tint. *Tip: When using process colors, you can lighten or darken a color by choosing the HSB model and changing only the saturation setting.*

USING BLENDS Orzechowski used the blend feature extensively for items such as the highlights on the hot dog, column and ball, but she adds, "Sometimes the automatic blend looks too perfect, too mechanical, so much of the blend work on the hot dog was done by hand [via the freehand and drawing tools] to give it a more irregular, natural look." ❺

THE SPEED TRAIL Blend was also used to create the evenly spaced speed trail on the baseball. The blend was copied twice so that there were three blended objects, one for each stripe of the flag. The lines in the blend are all the same length, so the baseball was placed on top, and two more objects were added to create the "u" shape.

Tip: The artist uses the duplicate function whenever possible because while simple, it saves a lot of time. She often creates only half an object, such as a column, then uses Corel's Horizontal Mirror feature and selects Leave Original. This creates perfectly symmetrical objects in half the time.

TYPE AND GRAPHICS

The Combine feature in Corel Draw does just what it says: It literally combines two (or more) objects into one, saving you time-consuming manual work when creating effects like positive/negative or merging text with graphics. In fact, Combine really shines in its handling of text, as it allows you to merge them automatically ❻, ❼, ❽. *Tip: Other programs require several steps to combine elements. For example, FreeHand has a feature called Join Elements which allows you to merge two paths, but then you must choose Element Info to control the fill.*

TROUBLESHOOTING PRINTING Combined objects often have very complex paths that may create EPS files too complicated to print. Corel automatically breaks paths into new paths as it exports, but sometimes the paths are still too long. So if you have problems, you must export to the Adobe Illustrator format (.AI) and then import the .AI files. *Tip: Corel cannot import its own EPS files.*

During the export process, Corel will have broken the paths into new, smaller paths, and sometimes, but not always, these new paths also may contain subpaths. These subpaths may cause printing problems. So after exporting the file and importing it again, Ungroup the artwork, then use the tab key to cycle through the objects. If the status line beneath the menu bar says the path contains subpaths, press the spacebar to leave Node Edit, then choose Arrange, Break Apart. *Tip: This will not change the appearance of the graphic, but it will break the subpaths into their own individual paths.* ■

Daniel Will-Harris is the author of several books, including, "TYPEStyle: How to Choose and Use Type on a Personal Computer" (Peachpit Press).

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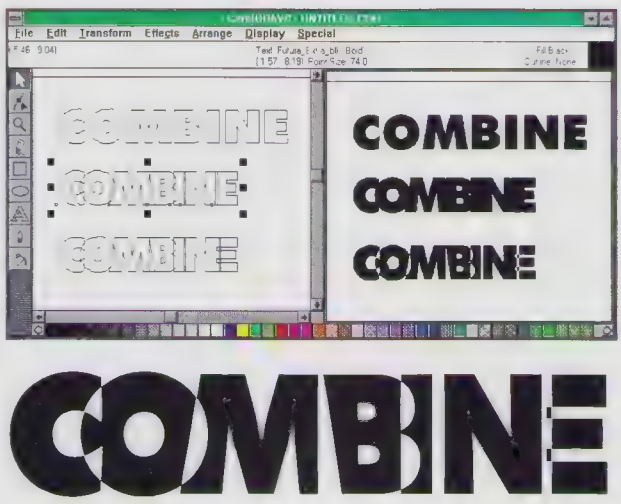

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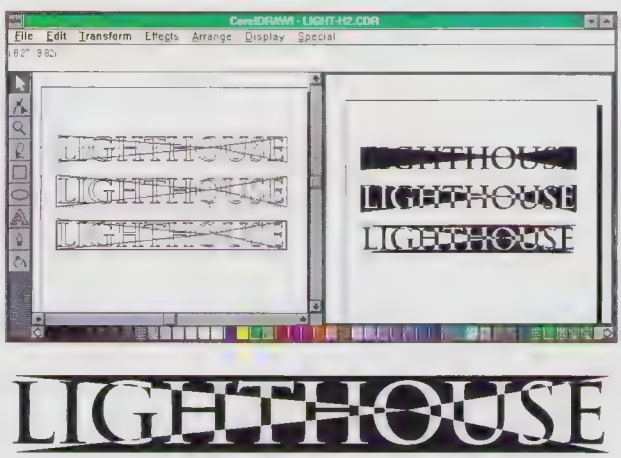


6 The Op-Art "S" is a simple example of how the Combine feature creates single objects where the fill reverses at each junction of the paths, creating striking effects. First, create a large circle, then a small one, and using Blend, create 10 more evenly spaced circles. Blended objects are always grouped, and the only objects Combine cannot work on are grouped objects, so you must first Ungroup them. Select them all and chose Arrange, Combine. The 12 circles automatically combine into one. Next, place a letter on top—in this case, a Futura Extra Black (Bitstream) "S"—then blend it with the circle object by selecting all the objects, choosing Arrange, Combine again. All the objects are now combined into one. Because of the complexity of the paths, this object has to be exported to .AI (Adobe Illustrator format), then imported back. At this point there may be objects that do not have the correct fill because of the way Corel broke the paths during export. Select these objects and combine them again, then export. Repeat the process until the objects import correctly, at which point they will print correctly. Changes to the design can either be made by editing individual nodes, or you can simply select the object and choose Arrange, Break Apart. The objects are broken down into their original pieces which you can then edit individually and recombine.

7 Combining text with itself creates effects reminiscent of type treatments found in Art Deco posters. Here, the word "COMBINE" was created by setting the word in Futura Extra Black (Bitstream), tightening the tracking in node edit mode, then converting the text to curves by choosing Arrange, Convert to Curves, which automatically changes text to curves and combines in one step. The letter "e" was edited manually by editing individual nodes.

8 Again, using Combine to create a sharp contrast of black and white where paths cross, the word "Lighthouse" was set in Adobe Trajan Bold. Next, two triangles were placed on top. Then the three objects were combined. Finally, the combined object was filled with white and placed on a black background to appear as a beacon in the night.

Painterly Facelifts for Frame Grabs

Filters are an instant solution for poor originals, especially when creating close-up portrait graphics for broadcast TV.

By Lynda Weinman

Consider the poor quality of frame grabbed images—not to mention the grueling deadlines in film, video and TV—and it's no wonder the desktop computer has made life a lot easier for broadcast designers. And with all of the new filters that can simulate a variety of traditional illustration and design styles, designers can give less-than-desirable originals some painterly facelifts in a matter of minutes.

An NBC on-air advertising project—with a four-day turnaround from concept to finish—is one example of the speedy use of these automatic filters. Los Angeles-based designer Harry Marks, of award-winning Marks Communications, received some video footage for "The Jill Ireland Story" mini-series on a Monday, had a comp to show the client on Wednesday, went into production on Thursday and delivered tape Thursday night.

FILTERS FOR PAINTING

Marks has been in the business of broadcast design for more than 25 years, and has created campaigns for every major domestic and European network. He was a Mac enthusiast back in the early pre-color days, and has watched the computer mature into an indispensable and highly capable broadcast graphic design tool. So he is no novice when it comes to getting the most out of filters—he has even written macros for customizing his most frequently used image processing command strings—and has long relied on those which are resident in image-editing programs like Photoshop, a program his studio uses regularly. But recently, at a demonstration of Aldus' new Gallery Effects filters—he was a member of the 1991 Aldus Graphic Arts Advisory Board—he was so impressed with the painterly effects he could achieve that he was eager to try it out on "The Jill Ireland Story" project: "I love Photoshop and I use it all the time, but even Photoshop filters like pointelize and mosaic can't give this kind of painterly look," comments Marks.

In essence, Gallery Effects is a set of 16 plug-in filters that can simulate a variety of graphic and painting styles—from fresco and film grain to splatter paint and charcoal. *Tip: Much like loading fonts (but not as time-consuming), plug-in filters can be loaded onto your system for use within different applications. These plug-in filters can be applied directly while you work in programs like Photoshop, ColorStudio, Painter, Digital Darkroom or SuperPaint 3.0, just by loading them into the program's Preferences folder. Once loaded, the filters are immediately available under the Filter menu each time you open the application. Gallery Effects can also be used as a stand-alone application without another program.*

After viewing the rough-cut ¾-inch video footage supplied by NBC for the spot, Marks took frame captures of some close-up portraits, using Photoshop and a RasterOps 364 24-bit color card. He saved the images as PICT files in Photoshop. *Tip: Photoshop offers plug-in drivers for many different video frame grabbers under the Acquire command in the file menu.* He then set designer Amy Nagasawa loose with Gallery Effects and the PICT files. Although she is an independent contractor, she has collaborated closely with Marks over the last four years ❶. *Tip: In Gallery*

Blending Filtered into Unfiltered
This close-up portrait created by Amy Nagasawa of Marks Communications for "The Jill Ireland Story" TV mini-series, began as a poor quality video frame grab and ended up as a tasteful graphic addressing the sensitive theme of terminal cancer. On her Mac IIfx system, Nagasawa blended a filtered image (using Aldus Gallery Effects' Watercolor filter, above left, and Dark Strokes, above right) into an unfiltered duplicate to reach these final, painterly solutions. NBC ultimately chose the Dark Strokes filter effect.

Effects you can preview, open and crop PICT and TIFF images, and a stand-alone application called Gallery Effects Animator supports the PICS file format, a multiple frame PICT file format that supports animation.

USING WATERCOLOR

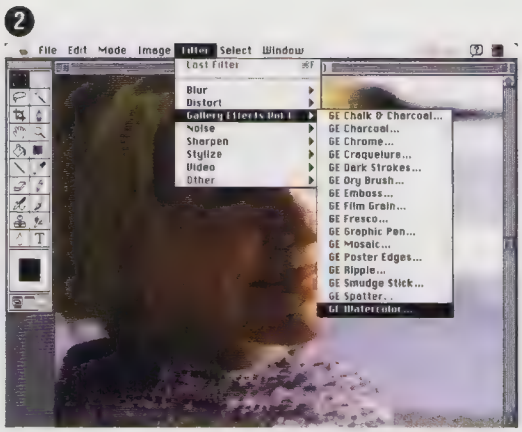
The sensitive subject matter of terminal cancer addressed in the mini-series required a powerful but tasteful graphic. Working in Photoshop on her Mac IIfx system (with 8 mb RAM, 210 mb internal hard disk and a Syquest 45 mb removable hard disk), Nagasawa began experimenting with the delicacy of watercolor first ❷. After selecting watercolor from the Filter menu, she and Marks were able to view the effect in the preview window. *Tip: One of the key differences between using a Gallery Effects' plug-in filter and one which is resident in a program is that the Gallery Effects plug-in allows the user to preview the effect before execution.*

In the watercolor preview window, Nagasawa was able to set the desired brush detail, shadow intensity and texture ❸. *Tip: There are different settings for each filter.* This preview feature saved rendering time, because she could play with the settings before clicking the Apply button to commit the entire image to the filter. After applying the effect globally, she removed the time codes from the frame grabs with the rubber stamp tool. *Tip: The rubber stamp tool in Photoshop clones any part of the original image and allows you to paint with that selection over your original file* ❹. Next, by choosing the Duplicate command under Calculate in the Image menu, she duplicated the image to a New channel of a New file. With both the original and the duplicate open on-screen, she selected the old file and chose Revert from the File menu. In this way she would have both her filtered file (the duplicate) and the unfiltered version (the reverted image) available to continue her experimentation ❺. *Tip: Using Duplicate and Revert saves clicks and time over using Save As (to save the filtered image under a new file name), Revert on the old image (to save a clean version) and then opening the new file, so that both are on-screen at the same time.*

Looking at the watercolor effect that had been applied globally to the image, Nagasawa and Marks felt the look was much too harsh ❻. So working with both the clean file and the filtered one, they blended the filtered image back into the original, using the Blend function (under Calculate), with the filtered image set at 60 percent opacity. This provided a much more subtle effect ❼, ❽.

Before shipping a 5 x 7-inch color print to NBC for approval (output from a high-quality, non-PostScript thermal dye sublimation printer used frequently in broadcast design work, the Sony Mavigraph), Nagasawa created the ITC Garamond Condensed type in FreeHand 3.0, converted it to Path, and then exported the file as an EPS ❾. She opened it in Photoshop where it was automatically antialiased. *Tip: With FreeHand 2.02, you could not import type into Photoshop because you could not Convert To Path. Had Nagasawa created the type in Photoshop, she would have selected the text tool and typed the text in the text dialog and then selected Antialias.* Nagasawa explains what she did next: "I made a new channel, copied the original frame into the channel, inverted it—I like to do that so I am working with a black background and type is white—then I went back to the original RGB image using Command-0 [zero]. Then I chose Load Selection under the Select menu. This will load the alpha channel and you can see where the mask is so you can fill it with whatever you want." In this case, Nagasawa filled the type, using the Blend tool, with gradated colors (white to lavender and yellow to orange). *Tip: For a linear fill, you select foreground and background color to determine your starting and ending colors, and then drag in the direction of the blend.*

In addition to the watercolor effect, Nagasawa and Marks also presented the frames with the "dark strokes" filter applied. "Dark strokes provided a directional brushstroke feeling," says Nagasawa, "and it ultimately



1 Photoshop offers plug-in drivers for many different video frame grabbers under the Acquire command in the file menu. This image of actress Jill Clayburgh was captured from moving ¾-inch videotape (with visible time code) using the RasterOps 364 board, a 24-bit color card.

2 From the 16 available filters, designer Amy Nagasawa first selected the watercolor effect. These are plug-in filters available for use in Photoshop as well as other programs. (Each effect can be customized for multiple variations beyond the original 16.)

3 The Gallery Effects filters have a preview window that allows the user to adjust the filter settings (there are different settings for each filter). Here, Nagasawa views a preview of Jill Clayburgh's eye with the applied effect, and with the original in view, after setting the brush detail, shadow intensity and texture. This feature can save time, as a designer can play with these settings before committing the entire image to the filter.

4 Earlier she had removed the time code using Photoshop's rubber stamp tool. This tool clones any part of the original image and allows you to paint with that selection over your original file. With the Option button depressed, she clicked the cursor over the area containing the texture with which she wanted to cover the time code. Then she released the button, moved the cursor to the time code and began painting.

5 By choosing the Duplicate command under Calculate in the Image menu and choosing New for both Destination and Channel, the "watercolored" file is duplicated. A clean original is made by choosing File, Revert to save the image in its unfiltered form, so it will be available for further explorations and enhancement.

FILES & FRAMES

The role of the Macintosh in the film and video industry has increased dramatically in the 1990s. All of the three major U.S. networks' broadcast graphics campaigns this season made heavy use of the Mac as a design and production tool. For example, ABC, CBS and NBC have direct Mac to Quantel Paintbox/Harry links.

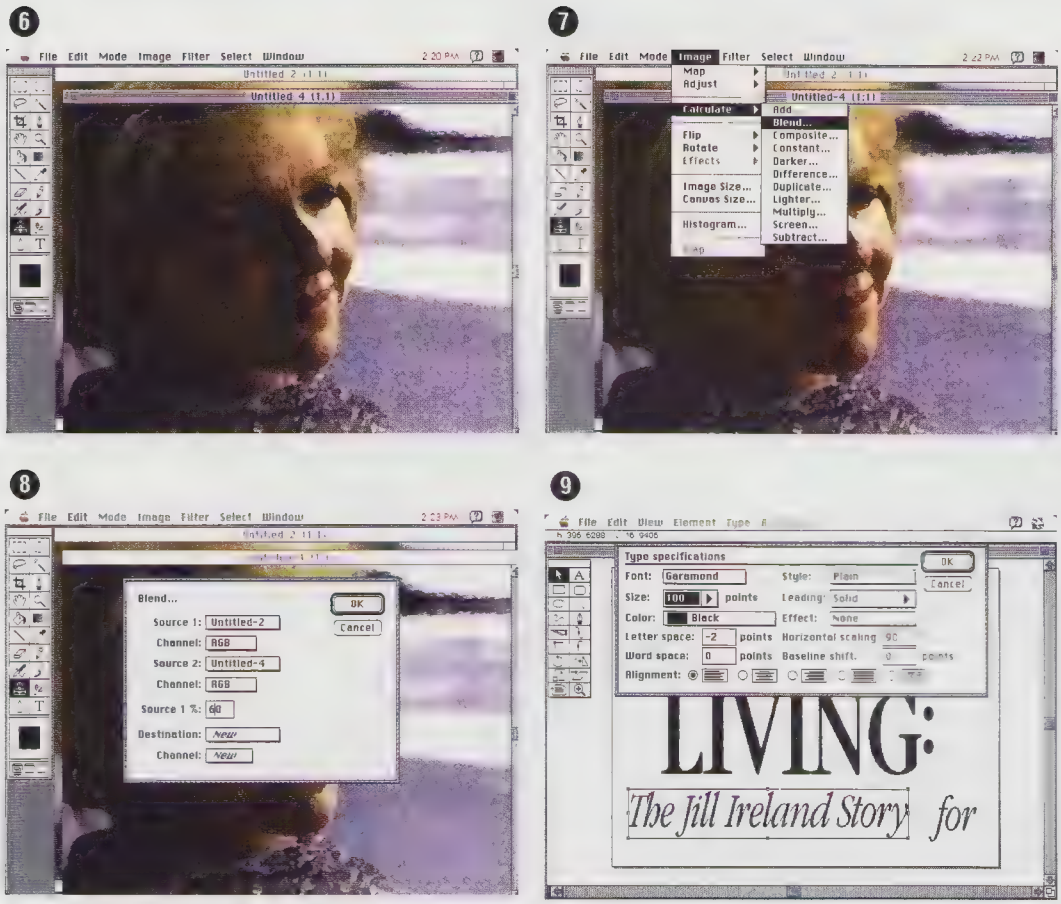
But because the translation from interlace video to non-interlace (single frame, RGB) computer files is often plagued with unwanted video noise and artifacts, frame-grabbed pictures—especially close-ups—are traditionally very low in quality. That's why the new plug-in filters as well as the filters resident in image-editing programs like Photoshop and ColorStudio go a long way in improving the look of frame-grabbed images.

To better understand this translation from moving videotape to single frame RGB desktop computer image, think of one frame of video as composed of two alternating fields, with half the visual information on each field (in the form of horizontal and vertical lines). For this reason, video designers who are viewing and designing their work for the NTSC multisync monitor must avoid creating single pixel vertical or horizontal lines—such as a single pixel dot in an image (because it would blink on and off)—as they can only appear on one field, causing the appearance of vibration and strobing. To avoid this vibration and strobing, "anti-aliasing" algorithms were developed to blend single pixels together to add information to each of the two alternating video fields.

was the effect NBC chose." But the client was equally impressed with both, especially because the effects appeared totally new to the broadcast group. *Tip: Neither the Quantel Harry or the Quantel Paintbox could produce this particular watercolor effect without laborious custom programming.*

FINESSING THE FINAL

With the comp copy approved, Nagasawa began to finesse the final image without the type, which would be composited with the bitmapped image later in the process. Because she had worked on the comp at a smaller window size (400 x 300 pixels)—allowing her to have a lot of windows open to copy and paste from, and without filling up her Syquest with large image files—she had to create the larger files (640 x 480 pixels). Although she didn't have any way to preview the artwork in NTSC format (National Television System Committee), her experience told her that even though the RGB Mac screen displays a very different color range, the colors in the art



6 Once the watercolor effect was applied globally with the Gallery Effect settings, Nagasawa and Marks felt this look was too harsh.

7 Photoshop's Calculate, Blend command is used to mix the filtered and unfiltered images.

8 The filtered image was set as Source 1 and the unfiltered image as Source 2. The Source 1 percentage was set at 60, Destination and Channel were both set at New, and the OK button was clicked. Reducing the watercolor effect to 60 percent of its original intensity by mixing the two versions of the image produced a more subtle, pleasing result.

9 The ITC Garamond Condensed type was composed in FreeHand and then imported as an EPS file into the Photoshop image file for the creation of a 5 x 7 color print to be viewed by NBC. The type would later be composited with the final image on the Quantel Paintbox.

were subdued enough that they would not exceed the "legal" video palette. *Tip: The video palette features a full spectrum of colors that must comply with NTSC. For example, high-intensity colors like red and yellow are problematic in television, and each color in the spectrum has its own threshold as measured and tested with vectorscopes or waveform monitors.*

FROM MAC TO PAINTBOX

If Marks and Nagasawa had wished to do so, they could have actually created the final composite of type and image in Photoshop, rather than work with a high-end production studio. First, they could have made the EPS file of the type into an alpha channel, brought the alpha channel into the RGB layer as an active selection, and filled it with white. But once the image was completed, they would not have been able to test the colors for NTSC compatibility because they didn't have the appropriate scope—a piece of hardware that hooks up to the Mac that would allow them to view the color in NTSC.

Tip: Although some software programs like Oasis and Photoshop offer tools designed to automatically filter out non-NTSC compatible colors for those working in broadcast, they don't always do so with complete accuracy. In addition, many users report that the scopes that hook up to the Mac do not yet offer the type of high-end quality required by the networks.

So the final image file, minus the type, was saved as a 24-bit PICT file, loaded onto a Syquest cartridge and delivered to View Studio in Los Angeles. There, Nagasawa worked with Quantel Paintbox operator and owner Bob Engelsiepen to execute the final graphics. View Studio has a Mac-to-Paintbox link via a NuVista+ 32-bit color card. *Tip: With this link, the design team can upload Macintosh files to the Quantel Paintbox for other high-end effects.*

While viewing the file in Paintbox, the color levels were checked on vector and waveform scopes. Just as Nagasawa had hoped, no adjustments were necessary. She made 300 dpi laser prints of the FreeHand type treatment and Engelsiepen captured it with a video camera for editing on the Paintbox. It was an easy session, as the artwork prepared on the Mac needed no additional finessing and the type was relatively straightforward to composite.

When NBC received the final video elements from View Studio, NBC Entertainment Advertising and Promotion cut the spots together, cross-dissolving from the computer graphic to the same frame in live-action. The promos were distributed to the affiliates by Friday and everyone was pleased with the results. In fact, as a result of that spot, Marks Communications reports that they have had an increase in requests for close-up portrait graphics. ■

Macintosh artist and studio owner Lynda Weinman is a Los Angeles-based professional animator and educator.

Combatting the 'Computerish' Look

From scanning and output to fixing banding and perspective, here's how to stay in control of your electronic art.

By Simon Tuckett

As graphic artists, we are our own best critics. Every time I thumb through a magazine, part of my mind is wondering just how each piece of artwork was produced. More and more often, I am noticing artwork that was obviously produced on a computer. And even though electronic design and illustration is my vocation, I'm not sure that this is a positive trend. In short, the computer is no substitute for an artist in the subjective process of design.

While there are occasions when a computerized look is appropriate for an illustration, there are many more times when it isn't. This article will explore some of the ways you can put impact into your artwork without drawing attention to the device that created it.

COMPUTER 'AIDED' ART

I counteract my own "click of the button" haste by designing only on paper, with a pencil or chubby felt marker. The quality of a line doesn't count, but the energy it injects into the sketch does. Paper is a place where you can harness that concepting energy. Although my sketches may be small (usually no more than 2 x 3-inches), they are the cornerstone of all my electronic work, a reminder not to be diverted by the capabilities of the machine.

Another way to avoid the digital design trap is to read software manuals. Granted, this is not a very lively pastime, but I do find they are a tremendous source of new techniques. The manuals alert me to errors that I am making, or uncover things I did not know the software could handle.

BITMAP PROGRAMS

The main pitfalls awaiting the person generating artwork in a bitmap program are simple and in most cases are likely due to the misuse of the hardware. By far the most frequent error is maintaining scanning resolutions that are too low. The result is an image that contains visible sample points seen by the scanner (they look like small squares in the halftone) ❶, ❷. These sample points are too sporadic to create a truly digitized image and too noticeable to produce a crisp image.

The rule to follow when scanning an image for final reproduction is to have between one and two scanner sample points for every halftone dot in the final image. Having more than two sample points is overkill, a waste of both disk space and raster image processing time. So if you have an image that is four inches wide that you wish to place in a layout at the same size and later image at 100 lines per inch (lpi), you will need at least 100 sample points for every inch of picture when you scan it in. If you can afford the disk space, go for a 200 dpi sample rate. As the image approaches 200 dpi, it will become more crisp. Enlarge that same image 150 percent (so it is six inches wide), and you will need to scan the image at a finer sample rate to maintain the minimum number of sample points per inch. Better yet, use a calculator and the following formula to determine the minimum scan dpi rate: The final size (in inches) x final halftone rate = total sample points/the size of the original (in inches) = the minimum scanning rate x 2 = the maximum sample rate.

OUTPUT RESOLUTION Another problem often encountered with bitmapped art is the use of too fine a linescreen for the resolution of the output device. Even color images can look posterized if there is not enough output device resolution to render all the shades of gray in the image or separation ❸. This is particularly noticeable at fine linescreens where you find softer graduations in color. For example, an image may have a sufficient number of sample points but if it is output at 150 lines per inch on a device that resolves at 635 dpi, you will end up with only 16 shades of gray available

1 This control image for the following three figures was scanned in from a 3 x 5-inch photo on a Howtek Scanmaster at 200 dots per inch. The image was moderately sharpened (one pass only) and retouched (a new sky was dropped in) in ColorStudio 1.1, and then separations were output using a 150 linescreen at 2,540 dpi output resolution on a Linotronic L300 imagesetter.

2 The same image shown in Figure 1, this time sampled at a much lower rate, 100 dpi. The sample points are becoming visible to the eye (note the guard rail), producing a softer, more coarse image.

3 Here the linescreen for the image has been set at a level too high for the output device: 150 lpi rendered at 635 dpi produces an image that is highly posterized because there are only 16 shades of gray available on each plate.

4 With all the settings correct you can still ruin a good photograph by overusing certain effects. Here, ColorStudio's Sharpen filter has been applied three times to the entire image; it begins to look like a poor quality postcard. It is important to know just how much image manipulation is enough.

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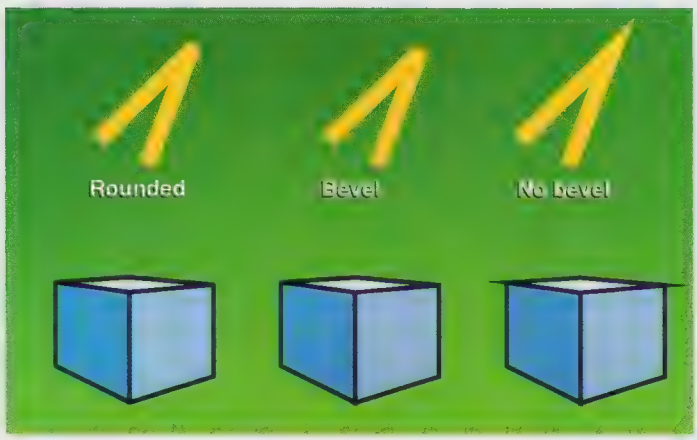
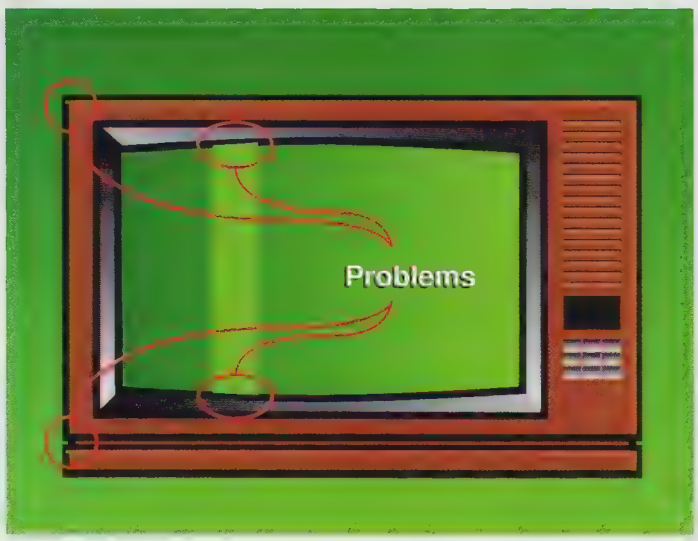


5 In FreeHand or Illustrator, your choice of corner point shape should depend upon how sharp the corners look in your artwork. While it is important to ensure that "linejoins" have good sharp ends, look out for spikes hanging over the ends of objects (far right). Reduce the length of spikes by reducing the Miter limit in the drawing program.

6



6 In any high-end, vector-based drawing program, when employing an illustration style that includes thick black lines around all the shapes, it is tempting to apply the linework to the same objects that get filled. This results in a lot of difficulty in the positioning of highlights and shadows. The best technique with this style is to draw the filled areas first and then duplicate them onto an upper layer. There the linework can be applied with no fills. All highlights can be placed on the lower layer. In this way the linework surprints the rest of the artwork.

on each plate. You can predict how many levels of gray you will get by performing the following calculation: Device resolution/linescreen = the number of output device pixels across the halftone cell^2 = the number of device pixels in the cell; and therefore the grays available at that line screen. (For example, 635 dpi/150 line = 4^2 = 16.) On a color image, the results will be less dramatic because you are working in colors rather than shades of gray. Sixteen shades of gray on each of four plates will result in 65,536 available colors. That may seem like a lot of colors, but it isn't; the image will still look posterized in gently graduating areas. The ideal situation is to run that same image at a much higher resolution. Using 2,540 dpi at 150 lpi will produce 256 shades of gray on each plate.

OVERDOING EFFECTS One of the strongest lessons I learned from an art instructor was that whenever you wish to retouch something (he was speaking about retouching with a paintbrush or an airbrush), consider how much retouching the art needs and then halve that amount. His words ring just as true for computer graphics. A common error is to overdo the application of a particular effect, whether it is the sharpening effect in ColorStudio or the lightening of an eye's highlight in Photoshop ❹. When I first worked in bitmap paint programs, my work was very heavy-handed, and the results left me quite disappointed with the process until I realized that I was overusing tools and features.

VECTOR PROGRAMS

Most of the same rules that apply to bitmap images also apply to vector-based artwork. Naturally, image resolution is not a consideration but the resolution of the final output device certainly is. But vector or object illustrations often have a cold, almost clinical quality. Some of that coldness can be diffused by warming up colors and altering the way the light plays on the objects.

SOFT SHADOWS We often see art that relies on the use of shadows for depth, but many times the graphic artist has not gone far enough in suggesting the nature of that depth. An object that casts a shadow from a height of three inches will cast a different type of shadow when it is six inches above the same surface. We frequently drop harsh shadows into our artwork because it is easy to duplicate an object, give it a darker tone and send it to the back. However, with minimal effort, we can produce a soft shadow that interferes with the illustration less, but carries as much impact. In addition, it will help soften the image.

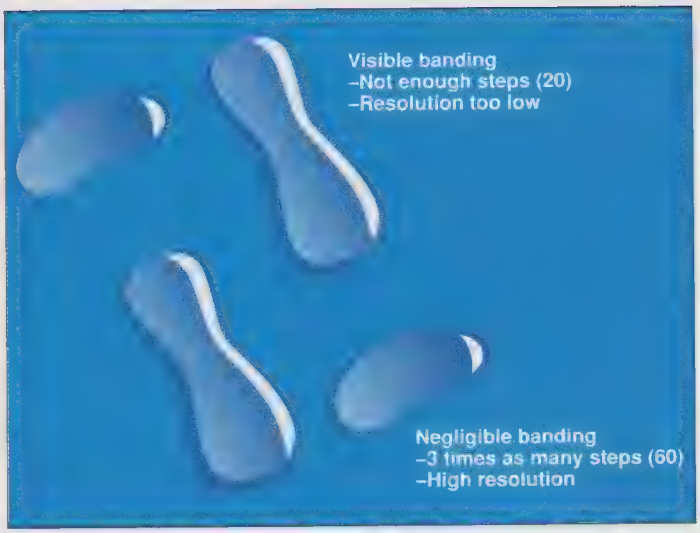
Another way to soften images is to take a brushstroke illustration or black marker rendering, scan it and autotrace it. The lines will all display a hand-drawn quality, and the open

areas can be filled with pure color, graduated fills, radial fills, or blends.

LINEWORK PROBLEMS One of the most frequent problems in vector-based artwork is that lines often don't join properly. While this may have been acceptable when the lines were rendered with technical pens, computers aren't so forgiving. Broken lines output on a high resolution laser imagesetter are glaringly noticeable. These lines result when an artist neglects to look at finished work at the highest enlargement possible.

There are a couple of ways in which this can be minimized. At the end of each project, survey the artwork at the highest enlargement and close up any noticeable spaces. You can also draw with Snap To Points on. While this can sometimes have a detrimental effect (newly placed points snapping to old points that you don't want them to snap to), it does allow you to draw at a lower level of enlargement and get the benefit of increased speed at that view.

SPIKES ON LINES Another noticeable problem is the presence of spikes on lines. Spikes at the intersections of lines are the result of line attribute defaults. The defaults can and should be changed while you are defining other attributes, such as line weight. For example, both FreeHand and Illustrator allow you to control the way corners are treated on paths. You can have round corners (using a radius described by half the line weight as the curve) or sharp points. In the case of 45 degree corners, a sharp point is quite acceptable. However, the more acute the angle of the incoming and outgoing lines, the further a sharp point ends away from the corner ❺. The drawing programs allow you to define at what angle the application cuts off or bevels the spike. In the Line Attributes dialog box, you can simply define what angle you would like the program to use. Few of us are able to predict what that angle is, so I often go to my worst (sharpest) corner and look at how it changes as I change the numbers in the dialog box. After awhile you get to know just how much of an adjustment will produce a better-looking corner.



7 With both FreeHand and Illustrator, care must be taken to ensure that there is a sufficient number of stages in a blend and a sufficiently high output resolution to resolve blends without the banding shown in the top droplets. By increasing the number of stages and the resolution, you can minimize the effect (bottom droplets).

8 FreeHand's graduated fills may be easy to create and define (just select Line and Fill under the Attributes menu, select Graduated, and fill in the color and angle boxes), but they have a highly linear appearance. To diversify the image quality, try using multi-stage blends. They may clutter your screen but they are far more flexible and they take less time to print on an output device.

❽

LINEWORK ON FILLED PATHS While it may not be an obvious problem, integrating linework on filled paths is often more hassle than it is worth. If you have defined a shape that has a green fill and a two-point outline, you will have reasonable difficulty placing a highlight that does not affect the outline's weight ❻. The highlight will dig into the line if you're not care-

9 For a multi-stage blend, take two shapes and blend between them with one intervening stage. Ungroup and duplicate this central copy. Now you can use these four paths to create two more blends, one above the other, producing a complete blend that hits three specified colors.

10 Another way to defeat banding is to open your favorite image-editing program (like ImageStudio or Digital Darkroom) and create a graduated ramp. Then superimpose a scan of a random texture over the top of it. The randomness of the file will diminish the visible bands. Alternatively, you could use a high-end color paint program (like ColorStudio or Photoshop) and apply a noise filter to a graduated shade.

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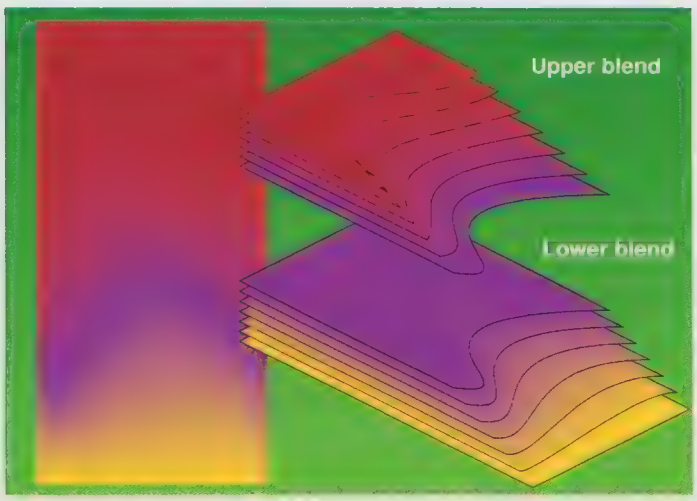

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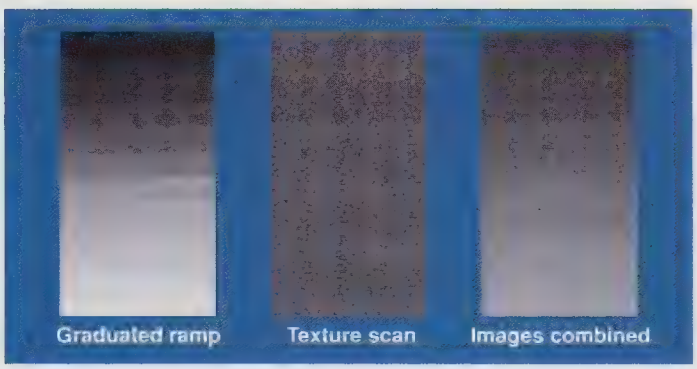

ful. The best way around this is to get into the habit of creating fills and lines as independent objects when you anticipate doing more than the simplest tonework. Create and define your fills, highlights and shadows, then duplicate those paths requiring a stroked line and give them no fill before assigning them to a layer higher than the filled shapes. In this way the fidelity of the original line weights will be maintained.

RAMPS One of the most frequent errors in computer art is graduations of tone that have bands in them. Whenever you make use of such ramps, first ensure that you are imagesetting them at the highest resolution available. If the graduation is comprised of a blend between two objects, be certain you have enough steps in the blend to accomplish the transition between the shapes smoothly. Adobe Illustrator automatically recommends the minimum number of steps in a blend the moment you invoke the dialog box. The number it supplies is based on the distance your ramp will be traveling and the resolution of the final output device described by your choice of printer in the Preferences dialog box. FreeHand performs a similar operation: It looks at the target printer resolution before writing the code to generate that fill ❼.

GRADUATED FILLS Graduated fills are also dead giveaways to computer graphics. They are terribly linear. You may want to try making more of the graduated effect by doing multi-stage blends instead ❽. Not only does this speed up output processing, but it allows you to travel through several colors on your way from one point to another. Consider varying the direction of the blend and the shapes of its components. Multi-stage blends can add a lot more depth to a blend.

Here is how it works: Define a blend between two shapes and give it at least one intervening stage. Ungroup so that you have three independent shapes. Then duplicate the central shape and create two blends: top to middle and middle to bottom ❾. (Multi-stage blends can be a lot more elaborate than this.)

BANDING If you have ramps in your art, keep the output resolution as high as you can afford and don't go for a linescreen that is higher than the one that will make your job work. Still getting bands? Try scanning a piece of texture, be it paper stock, cloth or carpet, and then save it as an image file of relatively low contrast. Now import this into a black-and-white image-editing application that supports levels of transparency in floating objects (like ImageStudio). Create a ramp that covers the range of tones you want, and then merge it with the texture image. The resulting image will be a ramp with noise in it, the noise camouflaging the banding ❿. *Tip: High-end color image-editing applications have built-in filters you can apply to the image that will apply the same noise to the selection. These effects are tremendous for creating the kind of random texture one expects to see in airbrush work. If you have access to these applica-*

tions, you don't need to scan a texture.

TYPE IN ILLUSTRATIONS

PERSPECTIVE One sure way to diminish the impact of a perspective illustration is to place sheared (or skewed) type on it. The lines of type, no matter how much you skew them, will not converge. Perhaps the simplest way to keep this effect to a minimum is to choose a very shallow angle of perspective. Another way to use sheared type is to leave plenty of visual space between the lettering and other perspective lines ⓫.

TRAPPING ISSUES One thing that is easy to forget is that the same rules that apply to graphic objects apply to type as well. You'll often see art in which black lines have been correctly surprinted, but the outlines around type or their black drop shadows have not. Look at type blocks as just another graphic element and apply all the same trapping rules. Each character should be treated as just another outline to be assigned attributes. (Both FreeHand and Illustrator allow you to do this.)

MAKING NOTES One thing that constantly annoys me about the way that I work is that I forget to take notes. Quick notes are easy to make, and they are lifesavers when you have to redo something. This is particularly important when I have to edit text that has previously been converted to paths. Many times, I have stared at an earlier job on screen trying to figure out which of our 1,200 typefaces I had used, what scale it was set at and what the horizontal scale factor was. Lately, I type right on the artwork a little line of copy with no line and no fill to describe the typeface and other parameters, just in case it needs to be altered later ⓬.

A LACK OF CONTRAST In most cases, type in an illustration travels horizontally, sometimes through underlying tones. On its trip it is quite likely to travel through different areas where the contrast between the type and its background diminish. As a safety check, closely examine the contrast under a variety of conditions—on screen, in a laser print, in a color proof, if you find it necessary—to ensure that the readability of the material doesn't suffer.

YOUR GOAL

The most intimate interaction in an image's life cycle is the one-way relationship between designer and viewer. To maintain that relationship, our work can contain no distracting giveaways to suggest technique, no visual jars that would sidetrack the message. Toward that goal, use these techniques to stay in control of your creations. ■

Simon Tuckett is director of Creative Services for RoboShop Design Ltd., a Toronto-based electronic design studio which uses the Macintosh to produce graphic design for advertising and promotional markets.

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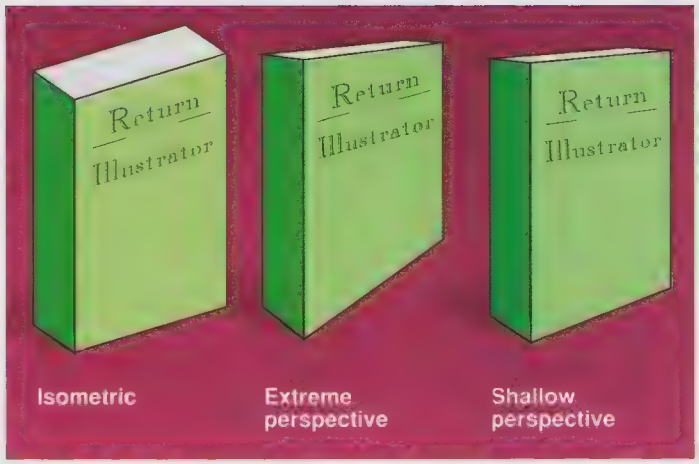
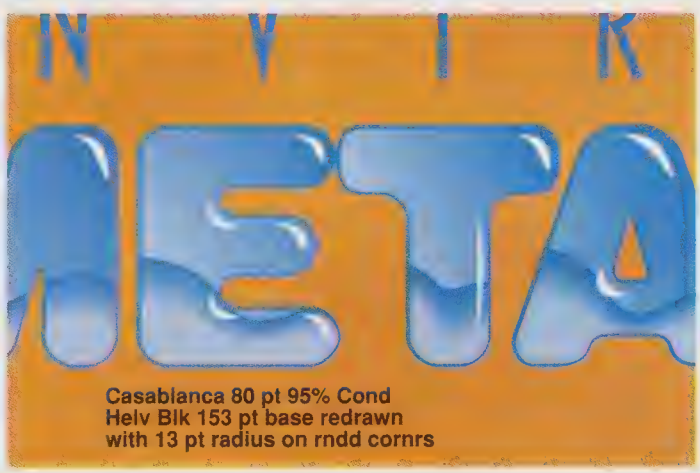


11 In drawing programs such as Illustrator or FreeHand, if you plan to use shearing to set type in a perspective illustration, that decision should have a bearing on how extreme the perspective is in your illustration. Sheared type may fit perfectly in an isometric drawing (left), but will look really tacky in one using extreme perspective (center). Keep the perspective shallow and, wherever possible, keep it away from lines running out to the vanishing points (right).

⓬



12 Tired of trying to remember the attributes of a typeface that has been converted to paths? I often place notes to myself right on the artwork. Both FreeHand and Illustrator allow you to tag notes to objects, but the note features themselves are not located in intuitive spots. By giving a logically placed note no fill and no stroke, you can ensure that it won't print.

When Two Heads Are Better Than One

New ways to share your work and studio space, including tips on invoicing and sharing equipment and supplies.

By Marianne Goldsmith

A Joint Venture This billboard campaign by Doug May and Chris Rovillo was used to launch the opening of a new farmer's market-style grocery in Texas. Both designers collaborated on the concept and design as part of a shared space, equipment and staff arrangement.

The business world today places new demands on design firms. To keep pace in a volatile marketplace, individual designers must simultaneously cultivate a steady clientele to support their staff and studios while continually upgrading and diversifying their portfolios. Add to this the perennial need of all creative minds for growth in new directions, and the stories that follow, of three pairs of designers who share space and work in new combinations, seem to be naturally evolving business equations to meet the challenges of our time.

In Dallas, Texas, designers Doug May and Chris Rovillo have joined forces in a shared studio space, equipment and staff arrangement. Rovillo Design Associates is May & Co.'s sublessor; they team-up on larger projects when appropriate.

In New York, the offices of Jason Calfo and Michael Aron operate both jointly and separately, depending on client needs. Each designer maintains his own separate firm (Calfo Associates and Michael Aron & Co.) and when a complex project lends itself to a joint effort, the account is assigned to their chapter S corporation, Calfo/Aron, Inc.

In Chicago, Steven Bagby still maintains his 10-year-old firm, Bagby Design Inc., but now is also allied with Ron Kovach under Bagby/Kovach, Inc., so the two can take advantage of more extensive projects that will lead them in new creative directions.

FOR SEASONED PROFESSIONALS

All three business situations are moves toward professional advancement for the principals involved. These designers are seasoned professionals, with well-established reputations and impressive client rosters. The decision to reconfigure their design firms so that they are not committed exclusively to formal partnerships is a new way to establish themselves in new territory while allowing each other room to grow individually.

"This wouldn't work with just anybody; trust is the key factor," admits Doug May. "Chris Rovillo and I have known each other for years. We worked together before in a Dallas firm, so we had a very strong collegial relationship going into this arrangement." After having spent 12 years in a large design agency, Rovillo was about to go out on his own. At the same time, May's partner—his wife—was about to take maternity leave. The timing was right and the two entered into a six-month agreement that turned into a more successful and ongoing endeavor than either had originally planned. May was surprised and pleased to observe his firm's revenues increase instead

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CRANE

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of decline, as he and his wife had predicted. Rovillo and May found their collaboration rewarding; May's company maintained its annual revenues and now the two regularly pitch a few clients together, marketing their combined talents in product packaging, advertising and annual report design.

GROWING THE BUSINESS

For Jason Calfo and Mike Aron, the decision to join forces was a pragmatic as well as a professional one. The two had studied at Syracuse University together and worked in the studio of famed typographer Herb Lubalin, remaining friends over the years. Each had gone on to develop his own small, successful firm and catered to different clientele; both felt the need to grow in size. In New York, available space is always at a premium. So five years ago, the two decided to move into a 2,500-square-foot loft, which they renovated to accommodate their independent companies. "New York has an extremely competitive climate," Calfo observes. "We knew we could capture larger clients through marketing our joint Calfo/Aron, Inc. portfolio—clients who want a more substantial firm to service them." The two consider their combined talents a highly complementary mix of styles—Calfo, who has a more corporate, formatted approach to design, appreciates Aron's gifts for visual problem-solving, which are reflected in his illustration work and experience with real estate, performing arts and educational institution accounts.

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TALENT SEARCH

"For 10 years I owned my own business," says Chicago-based designer Steven Bagby, "and I always wanted to find someone on my level, another principal talent who shared my ambition to enlarge the scope and spirit of the business." A long-time acquaintance with Ron Kovach, who was leaving the design department of a major corporation, became an opportunity for the two to combine their talents and take a big step professionally without losing momentum. Kovach's expertise in corporate annual reports, product introduction, and architectural graphics and exhibits blends well with Bagby's consumer packaging and corporate and brand identity. In November 1991, the two went public with their announcement to form Bagby/Kovach, Inc. (BKI), a subsidiary company of Bagby Design. "We see this as a good business decision," says Bagby. Ron Kovach is currently the sole employee of Bagby/Kovach, Inc., which maintains its own profit center and expenses. Two sales development representatives solicit new business for the Bagby Design firm and also promote the Bagby/Kovach duo when a project up for bid lends itself to the designers' mutual involvement.

STRUCTURAL ARRANGEMENTS

For each business association, the terms of the deal vary. In Dallas, May & Co. holds a five-year lease on its location, and Rovillo Design Associates has arranged a three-year sublease, with a two-year continuation option. Both firms share the services of an office manager/receptionist; May & Co includes a staff of three full-time designers and one part-time designer while Rovillo has one full-time employee who works with the principal. The two firms invoice each other on an hourly rate for work on shared projects, depending on who initiates the account. When billing a client, the percent-

age of fees paid the "outside" contributing designer ranges anywhere from 10 to 40 percent of the total fee. "Mark-up is understood," says Rovillo, when billing expense to a May & Co. project account. Conversely, when May worked on a Rovillo project and needed to rely on a vendor with whom he had already established credit, the bill went through May & Co.'s books, with a mark-up.

The two firms also share equipment and office supplies. May and Rovillo bought a Mac for every employee. Of the three in-house laser printers, Rovillo's is used exclusively for graphical output. In exchange, Rovillo has unlimited use of May & Co.'s photocopy machine, and the two firms alternate buying paper and toner supplies. May & Co. has a six-line telecommunications system and Rovillo uses two of the lines for his business, with a separate fax line and his own telephone equipment.

JUGGLING THREE ACCOUNTS When Calfo/Aron, Inc. was formed, all new business accounts were funnelled into the new company. Previous in-house accounts remained proprietary to each designer. Now, Jason Calfo's wife, Janet Calfo, works as business manager, handling administration and proposal writing for two of the three separate accounts: the firm of Calfo Associates—in which she is a full partner with her husband—and Calfo/Aron, Inc.'s joint projects. To attract new business, a sales representative has been retained to present Calfo/Aron's joint portfolio to new clients. To avoid accounting and billing confusion, the designers prefer to maintain separate accounts with different vendors. Mark-up follows industry standards.

The two estimate their initial joint investment at $75,000: $40,000 to renovate the space, install a telephone system and purchase new interior furnishings to augment their previous inventories, as well as overhaul the air conditioning system, plus an estimated $35,000 to purchase electronic systems. Since then, additional systems purchased have totalled about $15,000, and the team considers these resources to be their biggest expense. While the new firm only owns one Macintosh jointly, the designers freely use the seven Macs distributed among the two offices. In fact, they are networked together through System 7. Other cooperative efforts include sharing software expertise. The two designers have sent their employees to night school to learn these valuable skills, and have hired instructors to train employees on site.

SEPARATE PROFIT CENTER The new firm of Bagby/Kovach, Inc. is a separate profit center from Bagby Design Inc., but the two firms share office staff and electronic equipment. Since Bagby Design's studio was already established, the new alliance did not require a major joint investment. Bagby Design has a Mac-based Ethernet of 14 full-color computer stations, which are configured via EFI's Fiery Adobe PostScript RIP to a Canon 500 color laser copier. The copier serves as a photo scanner and printer. The network is also hooked up to a 2400 dpi Varityper Repro printer, which allows the studio to produce its own type fonts, a process that is monitored by the studio's in-house typographer. When a joint project is underway, Bagby Design sells its staff time and electronic services at a discounted, non-retail rate to Bagby/Kovach, Inc. If Ron Kovach works on a project for Bagby Design, he bills his services to the other firm.

BEST OF BOTH WORLDS

Sharing space and work has proved its worth for May and Rovillo. "It's worked out well. If Doug is bidding a project, he describes the job to me and we decide if there's room in the budget for my services," says Rovillo. "We're always up-front with clients about our joint working relationship. Our proposals spell out each job description—everything is clear. So far, no problems." The two enjoy working together and having the opportunity to bounce ideas around and exchange knowledge. A separate/joint relationship is equally satisfying for Bagby and Kovach, as well as Calfo and Aron. "Our collaborative effort has allowed us to cover more client bases and concentrate on three to four different markets—financial, real estate, the arts and 'advertorials.' We could never have succeeded on this level without joint portfolios," says Calfo. "We're also second-guessing the market," adds Aron. "And we've put a lot of money in our joint investment. We're taking the offensive, and we think it will pay off." ■

In addition to covering the arts, San Francisco-based freelance writer Marianne Goldsmith also writes about health care, film and women's issues.

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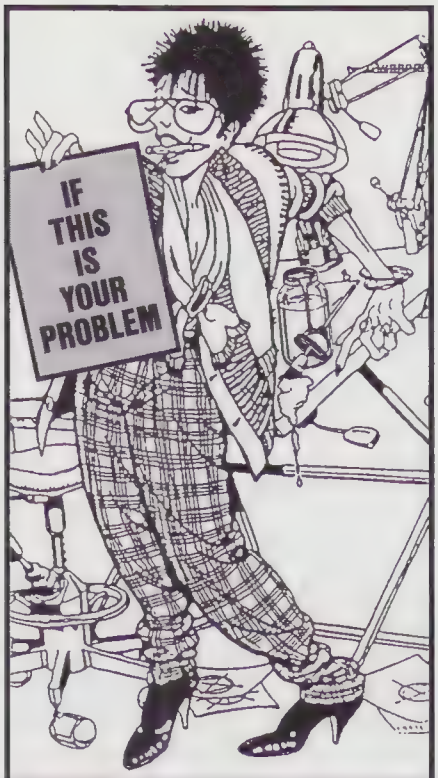

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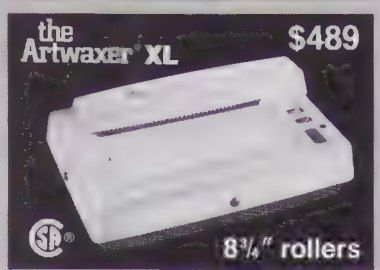

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REFERENCE SHELF

Book reviews of the latest and standard titles imparting how-to and career aid information

Encyclopedia of Oil Painting Techniques

If you are thinking of switching over to oil paints, this heavily illustrated book, complete with a number of step-by-step demonstrations, may just be the impetus to get you started. Written by British painter and teacher Jeremy Galton, it contains short demonstrations on such established oil painting techniques as alla prima, blending, broken color, knife painting, pointillism and scumbling, as well as less familiar approaches including peinture a l'essence (draining the paint of oil and mixing it with turpentine) and sgraffito (scoring lines or shapes into the paint after it has been applied). Although the demonstrations are short, they are clear and well photographed.

The second section, which comprises the bulk of the book, focuses on themes—architecture, figures, landscape, skies, still life and water—and the different approaches established oil painters use to handle them. Each of the subgroups contains one demonstration and numerous examples of the variety of approaches possible.

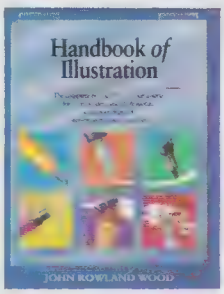
Running Press
125 S. 22nd St.
Philadelphia, PA 19103
192 pages; $24.95

Book of Caricature

If readers take author Bob Staake seriously when he states that the only way "for aspiring caricaturists to nurture their talents is by emulating and mimicking the great caricaturists...," then they will prove him wrong when they continue reading his new book, "The Complete Book of Caricature." With chapters covering not just the who's, what's, where's and how's, the book helps nurture aspiring artists by providing them with a thoughtful, and thorough understanding of this unique art form. Especially noteworthy are chapters covering the caricaturist as "facial detective," including tips on capturing personality by spotting the right features and mannerisms. Another is caricature reference, where you will learn how to work from photos, TV and video, real life and memory. The book concludes with profiles of 18 of the world's strongest caricaturists, interviews with the likes of Gerry Gersten, Robert Grossman, Al Hirschfeld, David Levine, Robert Risko and others. From Levine, for example, we learn that he doesn't crosshatch with his pencil sketches; he just smears the graphite around to establish the caricature. "Therefore, when the time comes to ink the drawing, I play with the pen to be creative and constructive. Without that, it would be terribly boring to just repeat everything. On the other hand, when I'm finished with the pen and ink, the drawing is flat and not nearly as full of the touch that is achieved with a nice, rich, soft pencil. The best [pencil] drawing has been destroyed by having to render it in ink for reproduction purposes."

North Light Books
1507 Dana Ave.
Cincinnati, OH 45207
144 pages; $18.95

Handbook of Illustration



If students earnestly did all of the exercises that are recommended in this hefty volume, they would have a very thorough introductory graphic arts education, as well as some strong new skills. Author John Rowland Wood, a designer, illustrator and teacher, says he wrote the book because he had been unable to find an all-inclusive manual on the philosophy and career training of contemporary illustrators. His basic instruction manual begins with a chapter on design and composition and follows with a lengthy chapter on basic drawing skills. This chapter, the longest in the book, contains 38 different exercises designed to train students' eyes and hands.

In addition to chapters devoted to marker renderings and color basics, Wood includes information on painting techniques, terminology, equipment and media. The 17 exercises begin simply, then increase in their complexity. Students will also find the 38 exercises in the chapter on illustration assignments helpful. Again, structured from the simple to the complex,

(Continued on page 188)

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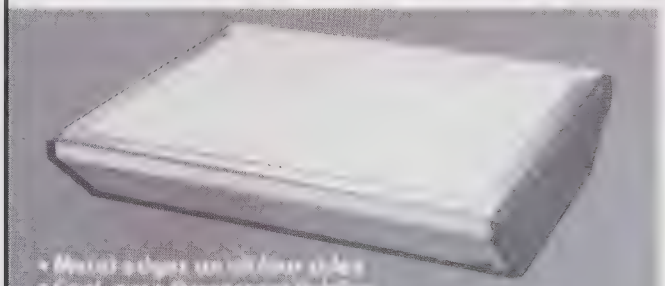

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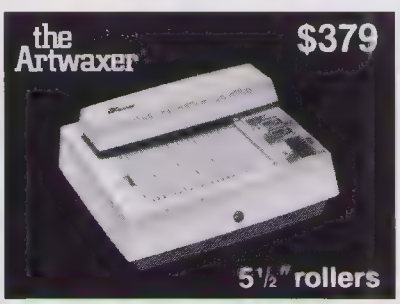

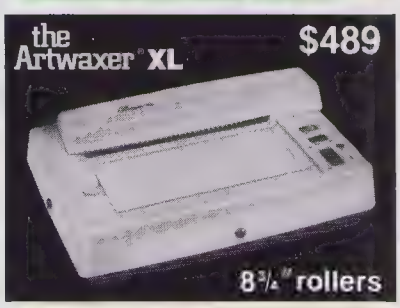

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Circle 44 on Information Card

(Continued from page 182)
students are asked to do a range of assignments, from cutting out silhouettes with black paper and a technical knife to designing a double-page spread for a magazine feature story

Because many illustrators are also designers and, of course, need to make a living, Woods also includes chapters on typography, reproduction, how to set up a studio and the business of illustration. While readers would no doubt prefer more color—there are only 26 color pages—the material is instructive and well organized.

Design Press
11 W. 19th St.
New York, NY 10011
288 pages; $39.95

Graphic Wit

If you count yourself among those of us who sometimes take graphic design too seriously, it's time to loosen up and learn to enjoy what you do—and more important, help your clients and audience enjoy your message. With the release of "Graphic Wit: The Art of Humor in Design," authors Steven Heller and Gail Anderson bring to the field the first comprehensive survey and analysis of what we would all agree is one of the most enviable talents a graphic communicator can possess: The ability to make messages memorable through humor. Chapters in part one begin with an historical approach and thoughtfully move on to the internal workings of contemporary humor, including discussions of techniques such as distortion, juxtaposition, repetition, scale and transformation, as well as specific genres of humor like the visual pun, parody, cliché and nostalgic wit. An entire chapter is devoted to typeplay, including rap type and funny faces. The second part of the book features interviews with more than 14 of the very best practitioners, including Paul Rand, Rick Valicenti, Stephen Doyle, Steven Guarnaccia, Elwood Smith and Paula Scher.

The book is full of strong examples of comic approaches to type and image, and its case studies of successful designs and ads provide a wealth of approaches readers can put to use in their own projects.

Watson-Guptill Publications
1515 Broadway
New York, NY 10036
160 pages; $29.95

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Illustration Portfolios (For examples of one- and two-color art and photographs printed on premium textured and transparent uncoated paper stocks.) Unusual is an understatement for this pair of oversized Gilbert promotions. Designed by Morava-OliverBerté with photographs by Everand Williams, Jr. and art by Joel Nakamura, the promotions provide plenty of paper, both printed and blank, for handling and experimentation. Their creamy, thick cotton pulp covers are attention-grabbers. (Gilbert Paper, 430 Ahnaip St., Menasha, WI 54952.)

Uncards (For duotones, four-color process, thermography and foil stamping on uncoated stocks.) Neenah deals out an entirely new kind of promotion, featuring four uncoated paper stocks in the form of a deck of cards, one stock for each suit. The promo is unique in its small size, handy for toting to presentations when necessary. (Neenah Paper, 1400 Holcomb Bridge Road, Roswell, GA 30076.)

The Architecture of Barcelona (For examples of engraving, foil stamping, embossing, laser diecuts, duotones and four-color process on colored, uncoated stocks.) In addition to the informative biographical and historical notes on the Barcelona Cathedral, Antonio Gaudi, The Barcelona Pavilion, Javier Mariscal and the 1992 Summer Olympics, this James River promotion provides plenty of tips for using engraving, offset lithography, foil stamping, diecutting and scoring, and embossing on uncoated stocks. (James River Corp., 145 James Way, Southampton, PA 18966.)

Recycled Alternatives Printing Demonstrations (For standard and specialty print treatments on recycled stock.) This hefty Champion promo is extremely well-thought-out: Each section of the spiral-bound book contains a different category of paper—cover, text, writing, publication, and label and envelope stocks—each designed to demonstrate performance. An intro sheet to each section shows serifed type (black on white as well as in reverse in various sizes), a four-color process photo, a duotone, a halftone, foil stamping, an emboss, and perhaps most helpful of all, a GATF Compact Color Test Strip. A healthy selection of colors and weights within the various lines completes each section. (Champion International Corp., 601 North B St., Hamilton, OH 45013.)

A Natural History of Color (For examples of one- and two-color printing on uncoated color stocks.) Ever wonder why purple is considered royal? In ancient times. the color was extracted from a tiny sea snail; more than 20,000 snails were required to dye one yard of fabric, so only the privileged could afford it. This and more color trivia is supplied in this Spectrascan promotion. (Scott Paper Company, 225 Franklin St., Boston, MA 02110.)

The Teslin Touch (For specifics on durable paper applications.) This brochure provides useful information on using a plasticized sheet for print applications including bar codes, labels, tags and durable forms. (PPG Industries, One PPG Place, Pittsburgh, PA 15272.) ■

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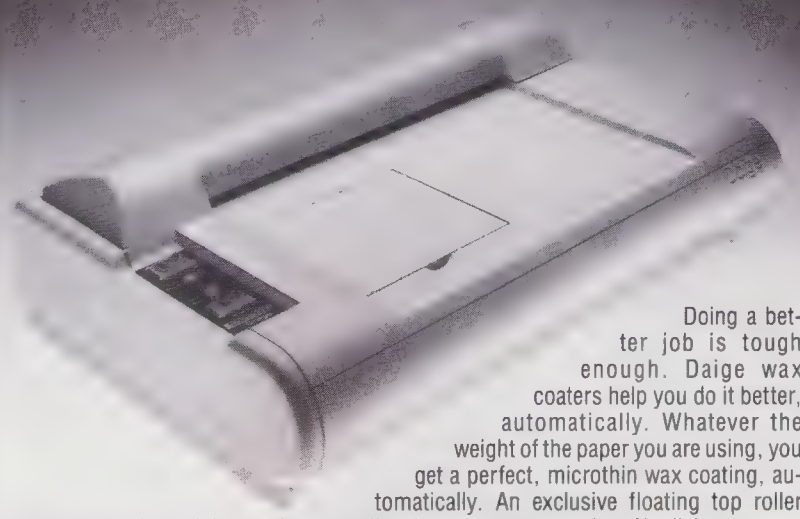

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CALENDAR

Upcoming seminars, trade shows, exhibitions, deadlines and events in visual communications.

MARCH

Communications Graphics Show March 5 through April 3, The American Institute of Graphic Arts, New York City. The winners of the 1991 AIGA national competition will be exhibited. Contact: AIGA, 1059 Third Ave., New York, NY 10021; (212) 752-0813.

NCGA's Business Graphics March 9-12, Anaheim Convention Center, Anaheim, Calif. NCGA exposition and conference with sessions on digital design, desktop color prepress, 3-D animation and much more. Contact: National Computer Graphics Association, Suite 200, 2722 Merrilee Dr., Fairfax, VA 22031; (703) 698-9600.

Print Production March 16-18, Fairmont Hotel, Chicago, Ill. More than 36 sessions and workshops for publishing professionals. Contact: South Wind Publishing Company, 8340 Mission Rd., Suite 106, Prairie Village, KS 66206; (913) 642-6611.

Front Page March 18-27, Art Directors Club, New York City. Work by School of Visual Arts students, redesigning the cover pages of New York's three largest daily tabloids, will be shown. Contact: The School of Visual Arts, 209 E. 23rd St., New York, NY 10010; (212) 481-5591.

34th Annual Exhibition March 18 through April 15, Society of Illustrators, New York City. Exhibit will include winning entries from the Society of Illustrators 34th annual competition. Contact: Society of Illustrators, 128 East 63rd St., New York, NY 10021; (212) 838-2560.

DesignWest/92 March 22-25, Chaminade Executive Conference Center, Santa Cruz, Calif. Workshops focusing on skills creative managers need to succeed. Contact: Design Management Institute, 107 South St., Suite 502, Boston, MA 02111; (617) 338-6380.

GRAFITALIA '92 March 25-29, Milan, Italy.

34th Annual Exhibition, March 18 through April 15, Society of Illustrators, New York City. (Artist: John H. Howard; Art Directors: Steve Gibbs, Karin Clare)

Desktop publishing, photography, printing equipment and more will be exhibited. Contact: Delia Associates, P.O. Box 338, Whitehouse, NJ 08888; (908) 534-9044.

Straight Talk March 26, AIGA/Miami, Mayfair Community Meeting Room, Miami, Fla. Roundtable discussion on negotiating contracts with illustrators, photographers and copywriters. Contact: AIGA/Miami, P.O. Box 145189, Coral Gables, FL 33114-5189; (305) 238-5633.

Adam Tihany Exhibit March 27 through April 10, Visual Arts Museum, School of Visual Arts, New York City. One-man exhibition as well as a lecture by the artist on March 30th. Contact: School of Visual Arts, 209 E. 23rd St., New York, NY 10010; (212) 679-7350.

APRIL

Magazine Publishing Week/West April 1-3, Hyatt at the Airport, Los Angeles. More than 90 seminars on marketing and advertising objectives, starting a new magazine, editing and other publishing skills. Contact: Magazine Publishing Week/West, P.O. Box 4232, Stamford, CT 06907-0232; (203) 358-9900.

Graphic Communications 3 April 2-4, Philadelphia Civic Center, Philadelphia, Penn. More than 900 booths will be exhibiting the latest in prepress, color publishing and electronic publishing applications. Contact: Graphic Communications, 7500 Old Oak Blvd., Cleveland, OH 44130; (216) 826-2878.

Word & Image Conference April 2-6, University of Baltimore, Baltimore, Md. Conference will examine new technologies that affect the publications industry. Contact: The Institute for Publications Design, Yale Gordon College of Liberal Arts, University of Baltimore, 1420 North Charles St., Baltimore, MD 21201-5779; (410) 234-3920.

50th Graphic Arts Exhibition April 3-17, Art Directors Club, New York City. Winning entries from the Annual Graphic Arts competition will be displayed. Contact: Association of the Graphic Arts, 5 Penn Plaza, New York, NY 10001; (212) 279-2116.

Images & Tools: Electronic Art & Design April 30 through May 1, Mark Hopkins Inter-Continental Hotel, San Francisco. Electronic illustrators and designers share their techniques. Contact: MacWorld Communications, 501 Second St., Suite 500, San Francisco, CA 94107; (800) 525-0643.

Scandinavian Artists: Call for Artwork Deadline April 30, The Forum Gallery, Jamestown, N.Y. Exhibition open to Scandinavian artists living in the United States or abroad that characterizes Scandinavian culture using any medium. Contact: The Forum Gallery at Jamestown Community College, 525 Falconer St., Jamestown, NY 14701; (716) 665-9107.

CorelDRAW World Design Contest Through April, Corel Systems Corporation, Ottawa, Ontario, Canada. Open to all registered Corel Draw users worldwide. Monthly winners are automatically entered in the annual competition. Contact: Corel Systems, Inc., 1600 Carling Ave., Ottawa, Ontario, Canada K1Z 8R7; (613)728-8200.

MAY

Dimensional Illustrators Awards Show: Call for Entries Deadline May 15, Dimensional Illustrators, Inc., Southampton, Pa. Fourth

(Continued on page 193)

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An alphabetized list of designers and illustrators featured in this issue.

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Danvers, MA 01923
508-750-4811

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225 N. Michigan Ave.
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Chicago, IL 60601
312-861-1288

Bill Baker
KRTN Graphics Network
774 National Press Bldg.
Washington, DC 20045
202-383-6065

Don Baker/Jeff Brice
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Suite 400
Seattle, WA 98121
206-441-8823

David Benton
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514-845-1636

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708-459-0520

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412-221-1617

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503-233-7715

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206-722-6746

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Des Plaines, IL 60018
708-296-2000

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Microcolor, Inc.
2345 Broadway, Suite 728
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212-787-0500

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JHDavis Design
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802-496-6400

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San Francisco, CA 94133
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Lawrence, KS 66044
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4Ward Productions
6565 Sunset Blvd., Suite 319
Hollywood, CA 90028
818-562-1411

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Conshohocken, PA 19428
215-940-0680

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Dallas, TX 75205
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802-464-5523

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804-783-2602

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Washington, DC 20009
202-797-8150

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1659 Doyle St.
Pittsburgh, PA 15221
412-242-8269

Presto Studios
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San Diego, CA 92196
619-689-4895

Hal Rucker/Cleo Huggins
Rucker/Huggins
196 Castro St.
Mountain View, CA 94043
415-960-1951

Todd Rundgren
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703-444-2616

Marc Yankus
570 Hudson St.
New York, NY 10014
212-242-6334

(Continued from page 190)
annual competition has categories in paper sculpture, paper collage, pop-ups, clay, plastic, wood and fabric sculpture. Winning entries will be exhibited at the Dimensional Illustrators Awards Show at the New York Art Directors Club, November 30 through December 4. Contact: Dimensional Illustrators, Inc., 362 2nd St. Pike, Suite 112, Southampton, PA 18966; (215) 953-1415.

Black Ink Through May 16, Cartoon Art Museum, San Francisco. Original artwork by African-American cartoonists will be on display. Contact: Cartoon Art Museum, 665 Third St., San Francisco, CA 94017; (415) 546-9481.

Elegance in Ornament Exhibit Through May 17, Metropolitan Museum of Art, New York City. Exhibition of 200 American Rococo art forms. Contact: Metropolitan Museum of Art, 82nd St. and Fifth Ave., New York, NY 10028; (212) 879-5500.

International Exhibition May 19-22, Paris-Nord Exhibition Center, Paris, France. Products and services from design and prepress work to finishing and printing will be exhibited. Contact: International Trade Exhibitions in France, 2300 Clarendon Blvd., Suite 310, Arlington, VA 22201; (703) 351-5670.

Humor in Art Exhibit May 22 through June 20, The Forum Gallery, Jamestown, N.Y. Exhibit will include works of satire, parody, irony and more. Contact: The Forum Gallery at Jamestown Community College, 525 Falconer St., Jamestown, NY 14701; (716) 665-9107.

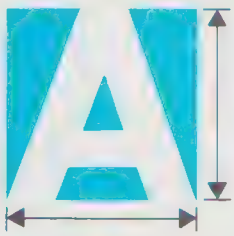
Educational Travel Programs Programs offered April through July. Educational travel programs to Japan, Italy, Venice and Copenhagen on illustration, architecture and graphic design. Contact: Pratt Institute, Brooklyn, NY 11205; (718) 636-3588.

Envision 18: The Creative Leap May 28-31, The Sacramento Community Center, Sacramento, Calif. The conference will offer exhibits, business seminars , a paper show and speakers including Massimo Vignelli, Sheila Metzner, Jilly Simons and Paul Brainerd. Contact: Art Directors and Artist Club, 2791 24th St., Sacramento, CA 95878; (916) 731-8802.

Kodak Creative Imaging Workshops Various dates throughout 1992, Center For Creative Imaging, Camden, Maine. Workshops on imaging processes and tools, desktop design, and digital prepress. Contact: Center for Creative Imaging, Eastman Kodak Company, 51 Mechanic St., Camden, ME 04843; (800) 428-7400.

Solutions & Shortcuts Seminars Various dates and locations throughout 1992. Conducted by Dynamic Graphics Educational Foundation instructors, sessions include production basics, freelance success strategies and color reproduction tips and tricks. Contact: Dynamic Graphics Educational Foundation, 6000 N. Forest Park Dr., Peoria, IL 61614-3592; (309) 688-8866. ■

Send your news releases announcing future events and deadlines, allowing at least two months lead time, to: Calendar, Step-By-Step Graphics, 6000 N. Forest Park Dr., Peoria, IL 61614.



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An alphabetical source list of the software and tools featured in the Digital section of this issue.

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Calcomp pressure sensitive tablets Calcomp, Inc., 2411 West La Palma, Anaheim, CA 92803, 714-821-2188, $495-$3,145
Canon Color Copiers Canon USA, One Canon Plaza, Lake Success, NY 11042, 800-652-2666, $22,500-$120,000
Canvas Deneba Software, 3305 NW 74th Ave., Miami, FL 33122, 800-622-6827, $399
ColorStudio Fractal Design Corp., 510 Lighthouse, Suite 5, Pacific Grove, CA 93950, 408-655-8800, $795
Corel Draw Corel Systems Corp., 1600 Carling Ave., Ottawa, Ontario, Canada K1Z 8R7, 613-728-8200, $695
Digital Darkroom Silicon Beach Software, 9770 Carroll Center Rd., Suite J, San Diego, CA 92126, 619-695-6956, $395
ElectricImage Animation System Electric Image, 117 East Colorado Blvd., Suite 300, Pasadena, CA 91105, 818-444-1819, $7,495
EPS Exchange Altsys Corporation, 269 W. Renner Rd., Richardson, TX 75080, 214-680-2060, $149
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The Font Company fonts 7850 E. Evans, Suite 111, Scottsdale, AZ 85260, 602-998-9711
Fontographer Altsys Corporation (See EPS Exchange), $495
FontStudio Letraset USA, 40 Eisenhower Dr., Paramus, NJ 07653, 201-845-6100, $595
FreeHand Aldus Corp., 411 First Ave. S., Suite 200, Seattle, WA 98104, 206-628-2320, $595
Gallery Effects Aldus Corp (See FreeHand), $199
Howtek ScanMaster Howtek, Inc., 21 Park Ave., Hudson, NH 03051, 603-882-5200, $8,195
Illustrator Adobe Systems, Inc., P.O. Box 7900, Mountain View, CA 44039, 800-833-6687, $595
Image-In Color Image-In Inc., 406 E. 79th, Minneapolis, MN 55420, 800-345-3540, $495; Image-In Color Pro, $795
ImageStudio Letraset USA (See FontStudio), $250
Indigo Silicon Graphics, 2011 N. Shoreline Blvd., Mountain View, CA 94043, 800-800-7441, $7,995-$27,000
Infini-D Specular International, P.O. Box 888, Amherst, MA 01004-0888, 413-549-7600, $895
Kurta pressure-sensitive tablets Kurta Corporation, 3007 East Chambers St., Phoenix, AZ 85040, 800-445-8782, $900-$1,250
LetraStudio Letraset USA (see ImageStudio), $249
LightWave NewTek, 7836 Second Ave. S., Bloomington, MN 55420, 800-368-5441, $4,595
Lumena Time Arts, Inc., 3436 Mendocino Ave., Santa Rosa, CA 95401, 707-576-7722, $2,495-$3,995
MacDraw Pro Claris Corp., P.O. Box 58168, Santa Clara, CA 95052, 408-727-8227, $399
MacPaint Claris Corp. (See MacDraw Pro), $125
MacroMind 3-D MacroMind/Paracomp, 600 Townsend St., San Francisco, CA 94103, 415-442-0200, $1,495
MacRenderman/Showplace Pixar, 1001 West Cutting Blvd., Richmond, CA 94804, 510-236-4000, $995
Microtek 300Z scanner Microtek Lab, Inc., 680 Knox St., Torrance, CA 90502, 213-321-2121, $2,695
NuVista video boards TrueVision, Inc., 7340 Shadeland Station, Indianapolis, IN 46256, 317-841-0332, $2,995-$4,795
Oasis Time Arts, Inc. (See Lumena), $795
PageMaker Aldus Corp. (See FreeHand), $795
Painter Fractal Design Corporation (See ColorStudio), $349-$399
Photoshop Adobe Systems, Inc. (See Illustrator), $595
PhotoStyler Aldus Corp. (See FreeHand), $795
PixelPaint Professional SuperMac Technology, 485 Potrero Ave., Sunnyvale, CA 94086, 408-245-2202, $799
Precision Type fonts 47 Mall Dr., Commack, NY 11725, 800-248-3668
Presenter Professional VIDI, 16309 Doublegrove St., La Puente, CA 91744, 818-918-8834, $3,600
QuarkXPress Quark, Inc., 300 S. Jackson St., Suite 100, Denver, CO 80209, 800-356-9363, $795
RasterOps RasterOps Corp., 2500 Walsh Ave., Santa Clara, CA 95051, 800-729-2656, $2,995
Ray Dream Designer Ray Dream, Inc., 1804 N. Shoreline Blvd., Mountain View, CA 94043, 415-960-0766, $895
Sculpt 4D Byte-by-Byte, 9442A, Capital of Texas Hwy. North, Suite 650, Austin, TX 78759, 512-343-4357, $3,500
Sculpt 3D Byte-by-Byte (See Sculpt 4D), $2,500
Softimage Softimage Corporation, 3510 Boulevard St. Laurent, Suite 214, Montreal, Quebec, Canada H2X 2V2, 514-845-1636
StrataVision 3D Strata, Inc., 249 E. Tabernacle, Suite 201, St. George, UT 84770, 801-628-5218, $995
Streamline Adobe Systems, Inc. (See Illustrator), $195
Studio/8 Electronic Arts, 1820 Gateway Dr., San Mateo, CA 94404, 800-245-4525, $295
Studio 32 Electronic Arts (See Studio/8), $695
Studio 3D Autodesk, Inc., 2320 Marinship Way, Sausalito, CA 94965, 800-879-4233, $2,995
SuperPaint Silicon Beach Software (See Digital Darkroom), $199
Swivel 3D Pro Paracomp, Inc. (See MacroMind 3-D), $695
TOPAS/MacTOPAS AT&T Graphics Software Labs, 3520 Commerce Crossing, Suite 300, Indianapolis, IN 46240, 317-844-4364, both $7,495
TypeStyler Broderbund Software, Inc., 500 Redwood Blvd., Novato, CA 94948, 800-521-6263, $220
UltraPaint Deneba (See Canvas), $199
Wacom pressure-sensitive tablets Wacom Technologies, Inc., 501 S.E. Columbia Shores, No. 300, Vancouver, WA 98661, 800-922-6613, $695-$1,495

Making Art in the 21st Century

Are workstations the next logical step in computer graphics?

By Patrick McDonnell

One day personal computers will disappear entirely—or so the researchers at Xerox Corporation are predicting.

This is the brave new world of "ubiquitous" computing. The computer will be as easy to use as the telephone. The two-dimensional artist will create directly on a flat TV screen with a pressure-sensitive stylus. The three-dimensional artist will use virtual imaging gloves or a body suit to enter into Cyberworld to create animations. "Beam me up, Scotty."

But who knows what the future will hold for graphic artists. Over a 30-year time period, I have switched from oil painting—using old master's techniques—to mastering 2-D and 3-D computer art. For example, here I am at midnight ready to put my computer to work rendering a complex 3-D illustration while I sleep. (My nine-year-old has finally let me squeeze in a couple of hours of 3-D modeling on my Mac.) And to think that it was just seven years ago, at ICOGRADA in Nice, France, when I was first introduced to computer graphics, at a Quantel Paintbox demo.

One thing we know, though, is that every artist who has made the switch from traditional to computerized tools wants more speed and memory. (Right now I would like to install a new flight simulation program. But my computer memory is full. Sound familiar?)

Although popular graphics programs like Illustrator, FreeHand, QuarkXPress and PageMaker do not require much memory, or speed, bitmapped paint and image-editing programs like Photoshop and ColorStudio gobble up computer memory like crazy. And 3-D computer graphics, when raytraced, need fast processors if you want the images finished this century. With desktop television production, even greater speed and memory is required to store and edit video images.

One way to get there is to upgrade to workstations.

WHAT'S A WORKSTATION?

Although there is no single definition of a workstation, they usually have the following characteristics in common, according to Norris Parker Smith, editor of *Super Computing Review*: They are microprocessor-based; they have substantial input and output capabilities; a large memory; a Unix operating system; a small, compact and air-cooled box; and a high price/performance ratio, among other things.

In essence, workstations are supercharged minicomputers falling somewhere between personal and mainframe computers. Once the exclusive domain of number crunchers—programmers, accountants and scientists—workstations are now being used by artists as well. According to Dataquest, during the first half of 1991, workstation sales were up 40 percent over the previous six months. Sun Systems sold the most, followed by Hewlett-Packard, Digital Equipment, IBM, Intergraph and Silicon Graphics. And there are other players as well, NeXT

3-D on the Indigo Montreal-based animator David Benton created this 16 mb image on his Indigo RISC workstation with Softimage's 4-D Creative Environment software (including its new ACTOR module) with 420 mb of hard memory and a DAT tape back-up unit which can store 1.2 gigabytes on a $10 DAT tape. After building the model with polygons, he assigned color, transparency, reflectivity and bump/texture maps in the program's Modeler. Next, he lighted the scene and ran low-res (1 to 2 mb) tests. The final was output to a 4 x 5 at a resolution of 2,000 x 1,638. (Because 24-bit display was not yet available at the time he created this image, his monitor dithered the 24-bit image to an 8-bit display.)

being the best known among graphic designers. In fact, the popularity of workstations has grown so much over the past several years that Apple Computer has positioned its new and more powerful Quadra 700 and 900 models to keep Macintosh users from defecting. And Apple is reportedly working with IBM on a RISC-based workstation (Reduced Instruction Set Computing technology), which basically translates to computer chips that are very, very fast.

WHY NOT UPGRADE?

One course of action would be to simply upgrade your old computer with extra bells and whistles; and indeed, a lot of artists are adding more RAM, additional external drives and accelerator boards to supercharge their systems. The new Apple Quadra 700 CPU board, for example, can be retrofitted into the old Macintosh IIcx and IIci, making them viable workstation contenders. The Radius Rocket board can be installed in the Quadra and—running under Saturn V parallel processing network software—can cut computing time in half for some applications like 3-D rendering.

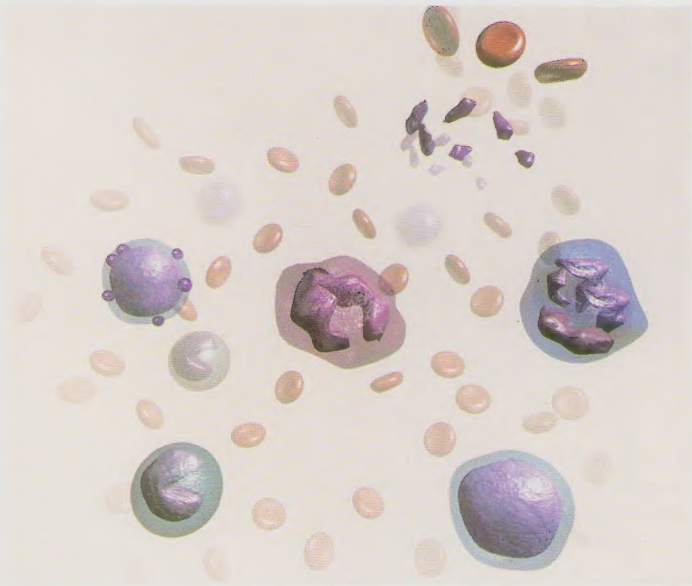
It is my view that inevitably everyone is going to be working on some kind of computer workstation. And whatever the name on the box, they all spell computer power. Linked together, they operate with supercomputing strength; by themselves they provide a full range of desktop design, publishing and television possibilities to the artist.

Every day there are announcements of more speed and memory in workstations, and prices are coming down dramatically. The harbinger of the new workstation for the graphic artist is the Silicon Graphics RISC-based Indigo, introduced in late 1991. Indigo's price alone, under $10,000, may have precipitated this year's price cut in the marketplace. Loaded with extras like CD sound and video, it can run MS/DOS and Macintosh programs as well as Unix software for high-end 3-D special effects, like the morphing effects seen in "Terminator II." Such power would have cost $100,000 a few years ago.

But Silicon Graphics is not the only player in the workstation market and all are slashing prices—some as low as $4,000 at the time of this writing. Apple Macintosh IIs and Quadras can run the workstation operating system Unix as A/UX in its user-friendly interface, and who knows what IBM and Apple will come up with.

Another reason why we, as artists, should be paying attention to workstation technologies is because they will allow us access to parallel computer networks, the latest revolution in computer technology. According to John Markoff's recent *New York Times* article, in a parallel computing network, "a task is divided into many pieces and several computers are put to work simultaneously, each to accomplish one of the mini-tasks and to bring the finished pieces of work together at the end." Each added computer increases the speed of the whole network. Lawrence Livermore Laboratory, for example, recently hooked together 14 IBM RS/6000 workstations in a parallel processing network and obtained supercomputing speeds at 1/40 the price. Apple researchers plan to test 300 Macintoshes in a parallel network using Ray Dream software.

Imagine being able to do everything for a client, from start to finish: broadcast-quality TV; audiovisual production and post-production; 2-D and 3-D animation, along with sound mixing and dubbing; color separations direct to plate; interactive training programs. All at hyperspeed, of course. And all under one roof. Yours.



3-D on the Iris Working on a 24-bit Silicon Graphics' IRIS workstation, the author of this article, Patrick McDonnell, first built 3-D wireframe models of cells using Softimage 3-D Creative Environment software. Next, he gave the cell models color, texture and transparency. Lights, background and atmospheric effects were arranged around the cells. Test renderings were made at low resolution and the final 6 mb image was raytraced and output to a 4 x 5 transparency via Softimage's Management Graphics' Solitaire Film Recorder at a resolution of 8,196 x 6,556.

WHERE WILL PAINT GO?

Where will all the traditional illustrators and designers be in this brave new world of computer workstations? I suspect they will continue their time-honored craft. In fact, I would venture to guess that their unique skills and talents might be in even more demand once the market is completely saturated with computer-generated art rendered at hyperspeeds.

But I have heard rumors of an odiferous computer program which will output the smell of turpentine and rubber cement. Now that's true "vaporware."■

Patrick McDonnell is an award-winning Montreal-based medical illustrator. His work was recently exhibited in the New York Art Director's Club Rx Show, the CAD design show "Pixel Palace; A Place for Alice," and the INTERFACE Computer Art show. He is now working with NHK Japan on 3-D HDTV computer graphics.

LOOKING AHEAD

A sampling of upcoming articles:

SPATIAL DEPTH WITH ACRYLICS

Using such visual tricks as patterning, overlapping and shading, artist T.P. Speer creates whimsical illustrations with brushes, airbrushes and acrylics on black paper.

DESIGN'S EMOTIONAL MESSAGES

Every design has an intellectual message and an oft-overlooked emotional message. Designer and author David Epstein explores when and how these successful emotional messages are developed.

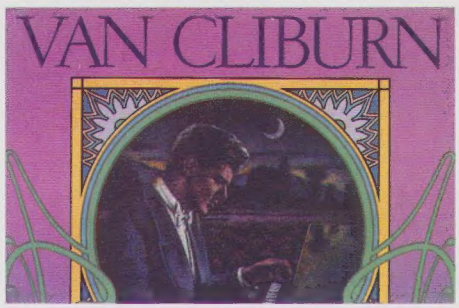
MONOPRINT ILLUSTRATION

Eve Olitsky demonstrates how she fashions makeshift plates using cut paper, then substitutes watercolor for ink in a unique monoprint process she uses to illustrate a cover for Atlantic Books.

WOODY PIRTLE ON PRESS

In a fascinating redesign of an industry standard, Pirtle shows how he created packaging designs with more than 22 match colors that were printed on a one-color press.

HAND-LETTERED TYPE



Drawing typographic forms, kerning display type and creating illustrative backgrounds and logos with pens and ellipses are just a few of the techniques Paul Perlow focuses upon in this typographically illuminating story.

CHARTS IN PERSPECTIVE

Throw an interesting, new slant on portraying statistical information by creating charts and graphs in perspective, using the computer and basic draw programs.

DIGITAL 3-D RECIPES

In this 3-D modeling and rendering tutorial, you'll learn techniques like extrusion, lathing, lighting and how to apply surface textures using such popular software programs as StrataVision.

HIGH FASHION BIKE GRAPHICS

How do you create designs for a parallelogram of tubes less than two inches in diameter? Mizuno and Associates explores the color choices and paint technology used in bike graphics, as well as the design considerations for creating bike logos, decals and PostScript type.

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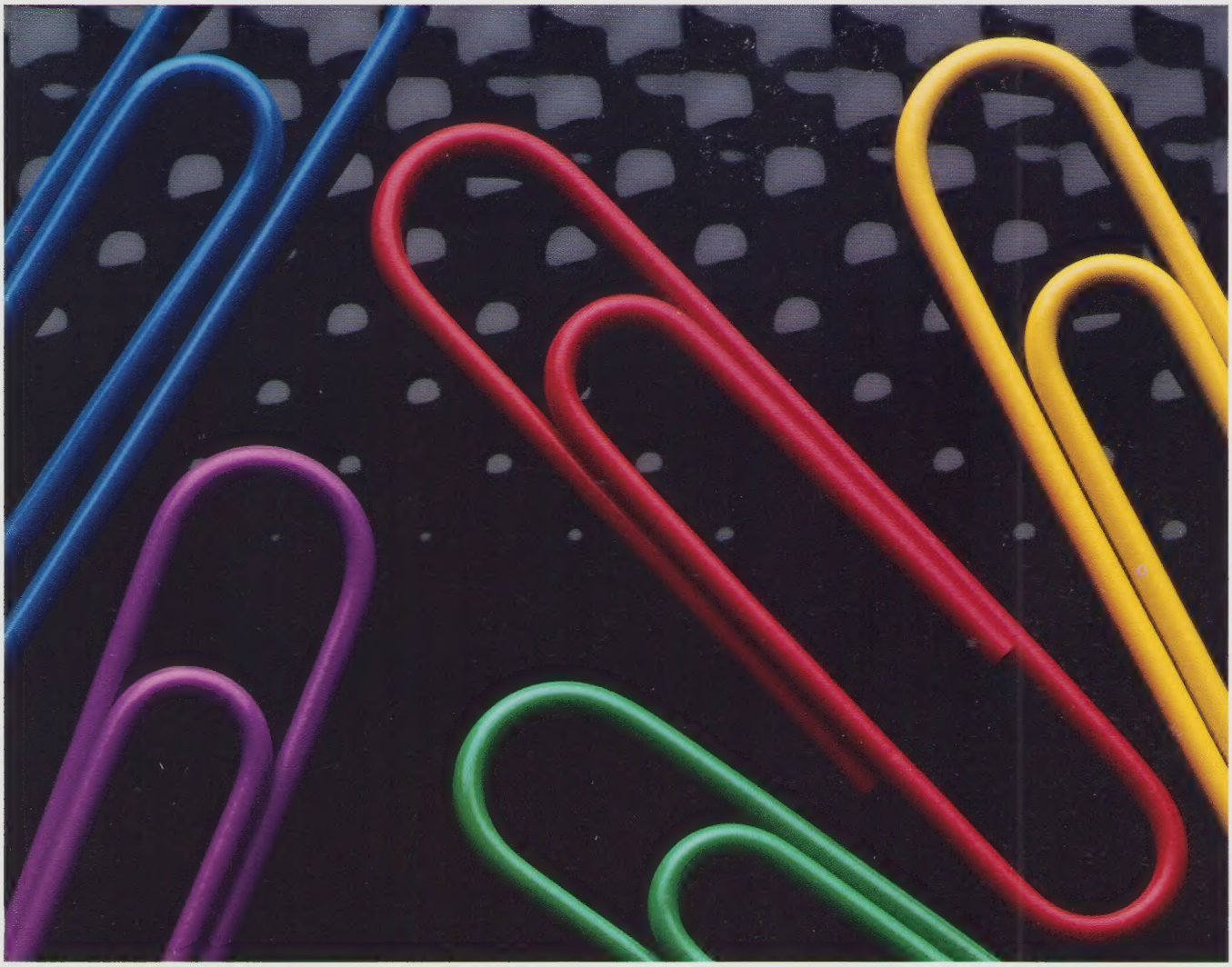

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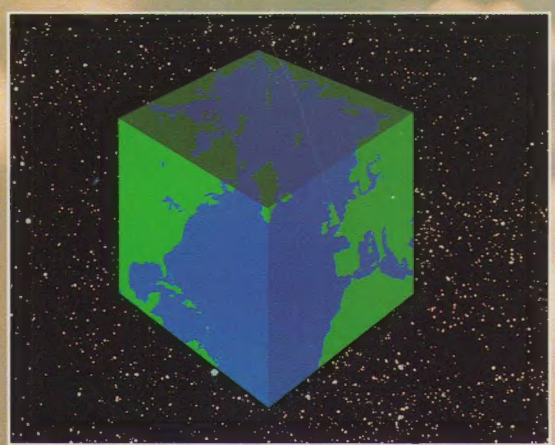
What If Dreams All Came True?



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